

In This Issue—Where Maintenance Rivals Sales

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MOTOR AGE

Vol. XLII
Number 23

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CHICAGO, DECEMBER 7, 1922

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Three Dollars a Year



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You can greatly increase your spark plug business by urging car owners to buy Champions by the set to assure better engine performance and an actual saving in gas and oil.

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There is a Dependable Champion Correctly Designed and Finely Made for Every Engine

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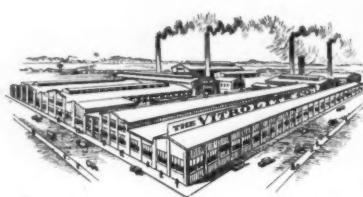
Dependable for Every Engine



Champion X is the one spark plug recognized as the standard for Ford cars, trucks and tractors. Millions are in daily use. They are a sure profit maker for you.

THE VITROLITE COMPANY

SOLE MANUFACTURERS OF



Chicago, Illinois

We hereby certify that the VITROLITE COMPANY has awarded to THOMA & SON, INC., of Fairfield, Iowa, U.S.A. manufacturers of the "THOMA SUNBEAM VISOR", the sole and exclusive rights for use, sale and distribution of colored "VITROLITE" for all automobile purposes, both domestic and foreign.

Dated at Chicago, Illinois, U.S.A., this 20th day of October 1922.



THE VITROLITE COMPANY

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Vice-President & Treasurer

THOMA & SON, INC.



Announcement: THOMA SUNBEAM VISOR —MADE OF VITROLITE

ROYAL PURPLE VITROLITE! Here at last is a Visor of exquisite beauty and richness—at a cost lower than that of most ordinary glass visors!

This is truly the crowning achievement in visor manufacture, an EXCLUSIVE SUNBEAM FEATURE. Vitrolite is a product of almost unbelievable hardness—a composition of sand, Feldspar, Fluorspar, Kryolith and other natural ingredients, fused at 3000° Fahrenheit. It is made for the Sunbeam Visor in quarter-inch slabs of uniform texture and color, with

a beautifully smooth, fire-polished surface. ROYAL PURPLE VITROLITE is not only the strongest but also the most beautiful material with which a visor can be equipped. It is semi-opaque—cuts off the glare but doesn't darken the car. Ribbed on the underside to diffuse the light.

Thousands of car owners who have refused to buy a glass visor will welcome the new Sunbeam VITROLITE Visor, which adds so richly to the beauty of any car, and to the comfort and safety of the owner.

This is your opportunity—write for details of liberal dealer sales plan.

The Sunbeam Visor is also equipped with green VITROLITE. The Sunbeam Junior for open and closed Fords is equipped with Thoma Process quarter-inch ribbed glass—Green or Amber.



Manufactured
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THOMA & SON - INC.
Everything in
Glass for the Automobile

Fairfield,
Iowa

MOTOR AGE

Published Every Thursday by
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Entered as Second Class Matter Sept. 19, 1899, at the Post Office at Chicago, Ill., under Act of March 6, 1879.

The Last Word in an Air and Water Tower



Perfect Balance Air and Water Tower

It is simple and foolproof, having no oil checks, counteracting springs or heavy weights to get out of adjustment or require replacement.

The head revolves in a complete circle on ball bearings, serving a radius of 15 feet from the post. Thus, all tires can be filled without moving the car.

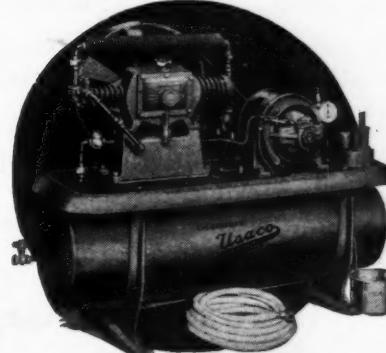
The hose is always clean, which appeals to motorists and makes regular customers of them. It serves water without splashing customers' clothes or forming mud puddles.

It quickly pays for itself in the saving of hose and air checks.

A slight pull brings the hose forward as needed. When released, it returns to a vertical position without lashing of the hose or racking strains on the tower.

Write for Descriptive Circular

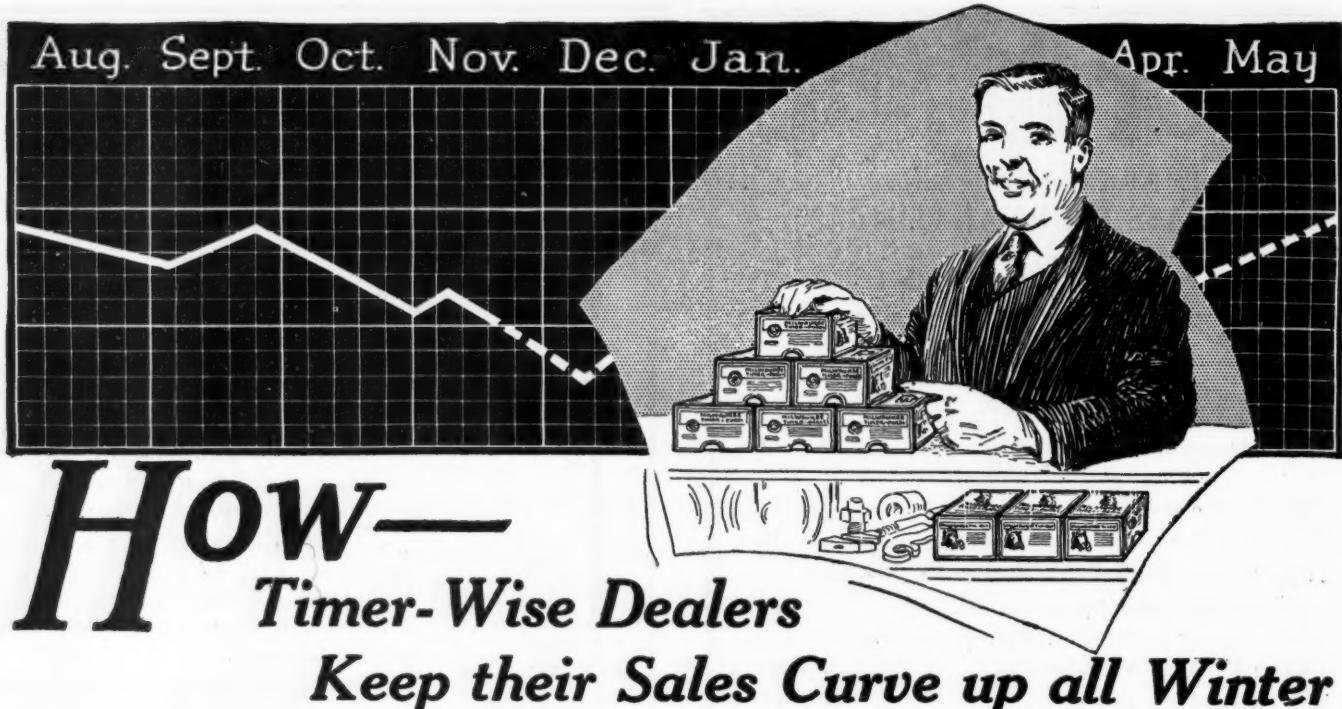
Ask Any User



Get the Usaco Catalog

It illustrates the entire Usaco line in large engravings, colored like the actual machines; describes the operating principle and points of superiority in clear, understandable terms, contains new and valuable scientific data with reference to air compressors, and points out conditions to be endured and pitfalls to avoid—to aid prospects in selecting the proper equipment—a machine that will afford maximum service and satisfaction.

The United States Air Compressor Co.
 5304 Harvard Ave., Cleveland, O.



How— Timer-Wise Dealers Keep their Sales Curve up all Winter

Timer-Wise Dealers don't have to depend on hood covers, robes, heaters and other cold weather items these days. They do a big winter business on standard goods—like *Milwaukee Timers*—by *pushing* them, with timely arguments.

You can move a surprising number of *Milwaukee Timers* over the counter in January and February. Most Ford owners drive all winter, you know, and cold weather emphasizes the need for a good timer, in good condition. Remind the customer that he needs a *Milwaukee Timer* more in winter than at any other time.

Window displays, counter displays, "new timer" suggestions to Ford-owner-customers—they all help. Try them and see.

And, if your Milwaukee Timer stock is running low—get an order off to your jobber today. Take advantage of the cold weather need for timers. *Good money in it for you!*

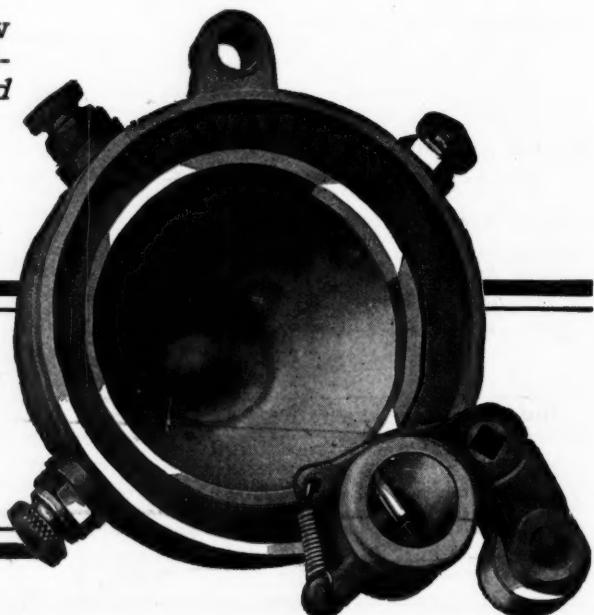
Here's a cold weather suggestion that usually results in a timer sale when passed on to a Ford owner:

"Cold weather and hard going call for a *better spark* than summer driving—hotter spark for easier starting, full power and steadier pulling, economy of 'gas' and battery. To get that hotter spark, you need the best timer you can get—the *Milwaukee*."

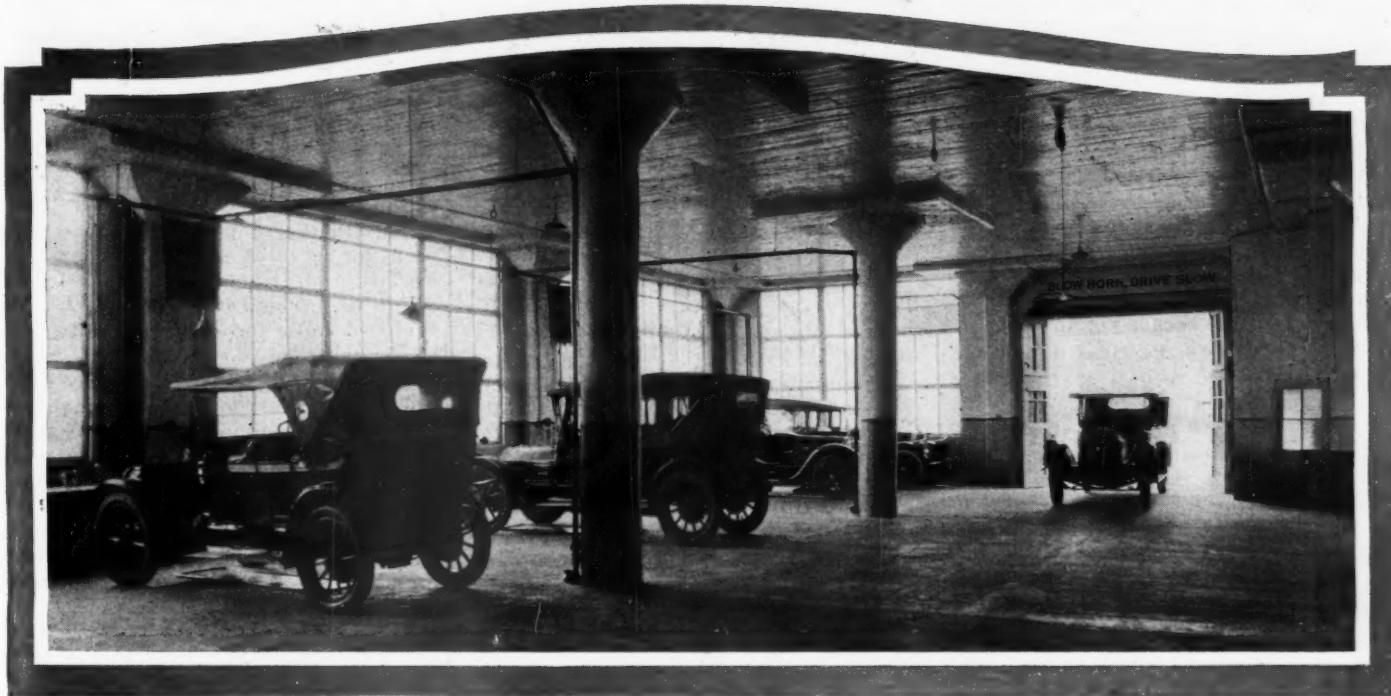
Milwaukee Motor Products, Inc.
Milwaukee, Wisconsin
(Timer Builders for over 17 Years)

MILWAUKEE TIMER for FORDS

Sells Fast at \$2.00



MOTOR AGE



Here is shown a car entering the service department through the electrically-operated doors. All minor adjustments and repairs are made in this section

Where Maintenance Rivals Sales

The American Automobile Co. of Milwaukee Has Maintenance Facilities Which Approach Very Near the Ideal. Shop Equally As Clean and Dignified as Salesroom

By B. M. IKERT

IMAGINE yourself stepping from a beautifully appointed salesroom through a pair of doors into a shop where cars are repaired and adjusted and that you have to take a second look around to make sure you are not still in the salesroom and you have some idea of the dignified, excellently-planned establishment of the American Automobile Co., of Milwaukee, distributor of Pierce-Arrow cars for Wisconsin and upper Michigan.

Another way of stating this is to say that the shop in this place is kept so neat and clean at all times that, except

for the wall which separates it from the salesroom, there is no real line of demarcation. As one man said:

"This is the first place I have ever seen where the back of the building looked as clean as the front part."

The company realizes that its most important job is to sell cars and consequently it is but natural that the most strategic corner of the building is devoted to the proper display of cars. But, the company also realizes that to build a business for permanency, it must adequately take care of the cars which have been put into the field and

consequently we find maintenance facilities in this organization that rival the sales facilities.

Before attempting to go into a detailed discussion of the things done to render uniformly good service to customers, it is well to present at this time the general arrangement of the building.

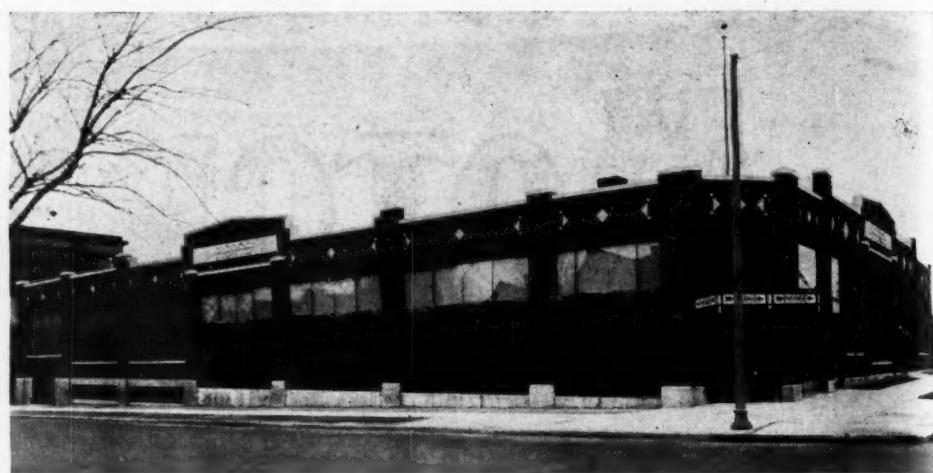
The plant, to begin with, is thoroughly in keeping with the dignity of the vehicle sold and in arrangement it approaches the ideal from the standpoint of the car owner and dealer.

It is a relatively immense building, spread out over an area of 120 by 180 feet, with a main floor and a subfloor of nearly equal dimensions, built upon foundations that will take care of additional stories when these are required in future years. The investment of approximately \$120,000 in building and equipment seems large when it is considered that this establishment serves but 275 to 300 owners, yet second thought makes it appear just fairly ample, considering that it is in this one spot that these owners, some residing as far as 450 miles away, look for maintenance on their cars. And, because of the class of owners, as well as the class of the car, when service is needed, it is wanted without delay and in a manner befitting grade as expressed in first cost.

There is another consideration, however, and that is that this model maintenance building must keep several hundred Pierce-Arrow trucks in steady operation to earn for their owners the largest possible income from the investment.

The building is located at the southwest corner of Prospect Avenue and Ivanhoe Place, on the principal thoroughfare leading into the exclusive east side residence district of Milwaukee. For many years the American Automobile Co. occupied an old building where property values were high and particularly so in relation to the needs of the Pierce-Arrow dealer when considered as the location of a new and adequate building. So the company followed the flag of its clientele, and located at a point of vantage which is steadily becoming a small "motor row" community.

It is virtually true that more Pierce-Arrow cars pass the new maintenance



The American Automobile Co. is located prominently on two important thoroughfares. Several stories can be added to the building when necessary.

station every day than any other point in Milwaukee, by which is meant that there is no other location in the city which is so ideal with respect to the market for sales and service of the Pierce-Arrow passenger car as the corner of Prospect Avenue and Ivanhoe Place.

The display floor, occupying the intersection corner, measures 32 by 100 ft., and is flanked by a battery of offices, first the general office, next the private office of A. E. Raffauf, general manager, then by the private office of Oscar Stegeman, sales manager, and lastly by a private office for the sales representatives.

Behind these offices, along the remainder of the Ivanhoe Place frontage, is the service floor, measuring 50 by 75 ft. Its purpose is to provide ordinary adjustment and general service not requiring shop work. It is equipped with electrically controlled doors and has a large wash rack, 22 by 25 ft. The service manager's office overlooks the entire floor. Adjoining this is the receiving room, which communicates with the parts and supply stock room, 50 ft. long and 23 ft. wide.

The remainder of the building, measuring about 80 by 120 ft., is devoted to the shop floor. This has an outlet to the service floor, as well as two independent outlets, one leading to Prospect avenue and the other directly opposite, leading

to an alley flanking the west side of the building.

Beneath the shop floor is a basement used for general storage of new and used cars, tires and parts.

The shop floor has its own wash rack, equipped both for water cleaning and cleansing of oily or greasy parts, as in disassembling jobs. The shop office overlooks the entire floor and communicates directly with the stock parts room. While the floor of the service floor is of concrete, that of the entire shop floor is covered with the best grade of maple flooring, kept spotlessly clean with electric scrubbing machines, both for the sake of appearance, sanitation and fire prevention.

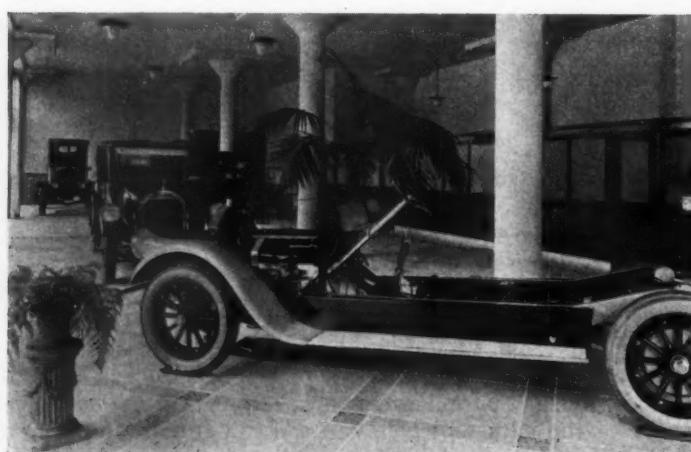
The machine shop proper, 25x50 ft., is ranged along the east wall, the Prospect Avenue side, and is set off with partitions from floor to ceiling. A space 12x20 ft. is partitioned off as an exclusively electrical appliance service room. This also accommodates the motor for shop tool operation.

The entire shop floor is served by a monorail system with chain blocks and hoists available at almost any point on the floor. Natural illumination is provided by vast expanses of glass in steel sash.

So much for the building and its arrangement. The reader thus having a mental picture of the structure, let us point out here some of the things which one observes on an inspection trip through this motor car and truck establishment.

Right at the start we should like to say that the many excellent features and processes for handling maintenance work from the time of the arrival of the customer's car or truck to its delivery are, after all, exactly those which the average dealer has it within his power to install in his own place of business.

There are those who no doubt will say before reading this article, "It's all right for Pierce-Arrow to do these things, but what's the little fellow going to do?" That is exactly the question we are going to attempt to answer in the following paragraphs, which have been inspired by

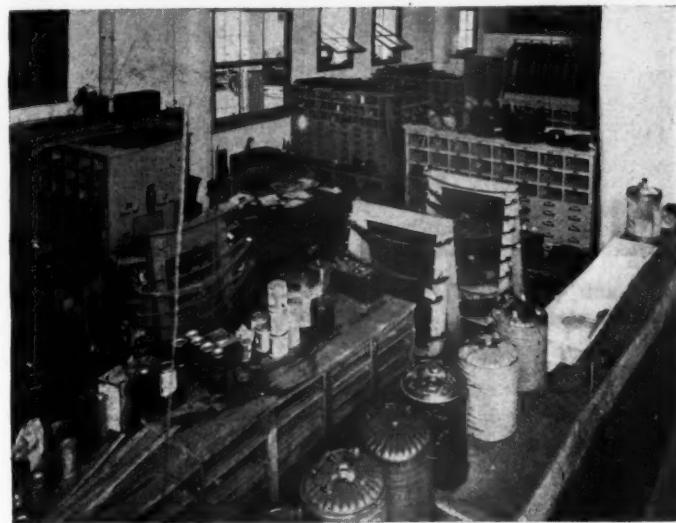


A view in the salesroom — simple, yet dignified

a recent trip through the American Automobile Co.'s maintenance establishment. The small fellow can learn from this place of business, because the things which are making it possible for this concern to have such an excellent busi-

tion. The grease hound, janitor, telephone operator, mechanic and all others are directly or indirectly sales people. They can help to make or break a sale.

The telephone operator, or information girl, call her what you wish, is certainly



The company carries parts for every model of Pierce-Arrow car ever built

ness are common every day things which any well conducted business, large or small, should and can do.

Let's begin with the telephone operator. We have often said in these columns that everyone connected with a dealer's business is a salesman for that organiza-

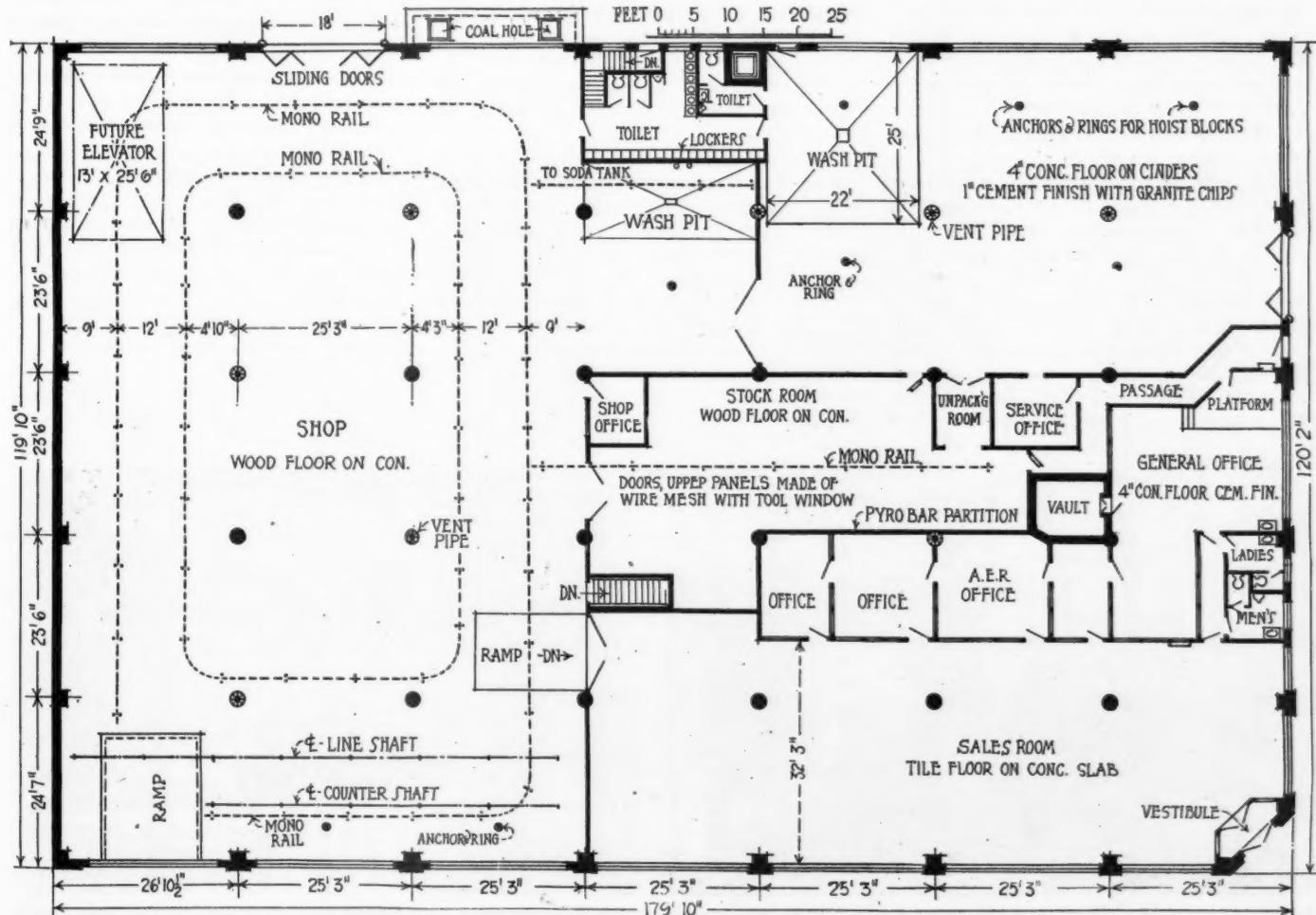
on to her job, if we are to judge by the treatment the Motor Age representative received when he called the establishment on the telephone. There was no snappy answer, "Mr. —— is not in now, anything I can do?" On the contrary she was anxious to please the

party making the call as could be told by the tone of her voice and the suggestions she kindly volunteered. It made you feel friendly immediately towards the entire organization.

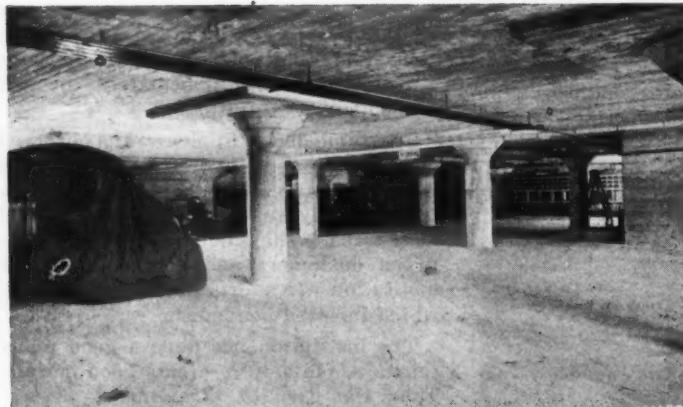
The same desire to please was observed on the part of all others connected with the organization. Mechanics talked in a friendly way to the shop foreman and vice versa. The same spirit existed between customers and executives of the institution. In short, there was a morale, which inspired confidence.

The institution has done a good many things which help to create good morale. Take the case of cleanliness. Everywhere you go about this place, you are impressed with the neatness and orderliness. Truly, the "Wonderful Woman in White" could walk about this place with the assurance that she would come out spotlessly clean. The accompanying pictures give some idea of the cleanliness. The stage was not set for the Motor Age representative. He dropped in unexpectedly, yet the place had the appearance of having been put in order especially for his benefit.

One of the factors contributing to the cleanliness and orderliness of this institution is the fact that everything is done according to a well defined plan. In the shop for example there is a rule that no tools are allowed on the floor. That in



Floor plan of the American Automobile Co.'s building devoted to sales and service on Pierce-Arrow cars and trucks. Note especially the central location of the stockroom and the disposition of the service manager's and shop foreman's offices to facilitate handling customers and shop properly



Left—The basement is used for storing owners' cars. The neat bins for "junk" parts are shown in the background. Right—Main repair shop. Note the overhead carrier system and the cleanliness of the wood floor

itself is responsible for a tidy appearance. Take the parts that come off a car being repaired. What usually is done with them in the average shop is to place them on the floor, on the bench, on the running board of the car, or even on the cushions of that car. But in this shop, the parts are carefully placed in a small truck which can be wheeled anywhere desired. The trucks are marked, so that no mistake is made as to what car the parts belong. Literally speaking, the only things that ever touch the floor are the mechanic's shoes, tires on the cars, jacks and drip pans which always are placed under a car when it comes into the shop.

The floor in this shop is wood. Wood because the management feels that it is not right to expect a man to lie under a car on a cold cement floor. Again, a wood floor is easy to clean. This one, in particular, is easy to clean because it never gets really dirty. Not only is it periodically scrubbed, but the fact that the cars that enter the shop are first cleaned helps to keep the floor clean.

Every car that comes in for repairs is first washed in the service department. Then the chassis and all the understructure is given a thorough cleaning in the washpit in the shop proper. Thus, before the men touch any repair work the parts have been cleaned and the

men keep clean also. On top of this the company washes the men's overalls twice a week. A mechanic in this place hardly could get dirty even if he wanted to. All of this effort toward cleanliness is reflected in the manner in which the men work.

The bench tops are scrubbed periodically and at 5 o'clock in the evening when the shop closes, you would swear no work had been done in the shop that day. There is not a single tool in sight on the bench tops. All the more common shop tools which are not kept in the tool room, such as wrenches and wheel pullers, at closing time are to be found on a special tool board placed against the wall of the shop. Each has its respective place and any missing tool is easily noted. The rack or tool board is painted gray to match the color of the walls.

The basement of the American Automobile Co. rivals the salesroom and shop for cleanliness and excellent handling of details. For instance, there is in the basement a neat parts rack which houses what the company calls "junk." Ordinarily this sort of stuff would be relegated to a junk pile somewhere in the shop. But this company feels that, inasmuch as there are many Pierce-Arrow cars of ancient vintage still in operation in the state of Wisconsin, there might

come a time when the owner of one of these cars would need just such a part. Therefore, the parts are cleaned of rust and otherwise carefully prepared for storage in the bins and racks. The latter are marked and numbered in much the same manner as an ordinary new parts stock. In fact, this parts stock of "junk" is kept as neat as the new parts stock of many dealers.

The institution has, of course, offices for the various executives in the sales and maintenance departments. The shop foreman also has his office. As shown in the plan layout of the building, his office is located at a strategic point, virtually in the center of the building. Here he keeps his own books and records.

The service office is located at a vantage point and is handy to customers who enter the building either through the small doors or through the electrically operated doors leading into the service department from the street. In the service manager's office are to be found catalogs and instruction books covering every model of car which the Pierce-Arrow company ever built. This makes it easy to check up on a parts order, especially where meager information only is given by the purchaser.

And speaking of offices for the various executives, it is interesting to note that



Left—The shop foreman has his own office, wherein are kept records and data. Right—In the service manager's office are kept catalogs and instruction books covering every model of Pierce-Arrow car

even the boiler room attendant has his "office" in which he keeps a set of books, records of the coal used and maintenance costs on equipment. It will readily be seen that the company realizes full well that there are many small items to watch in the business which, if not carefully recorded, will become leaks that threaten to gnaw materially at the cash register.

The machine shop is probably one of the finest in the country devoted to automotive maintenance. The same orderliness and cleanliness manifests itself here as in the other divisions of the building. The floor is of hardwood, excepting for a small section of cement where the forge, anvil and other blacksmith's apparatus is placed. There usually is a lot of messy stuff around a forge and anvil, but you are agreeably surprised when you note the cleanliness around this forge.

The machine tool equipment is well selected and the company is in a position to carry out practically any kind of repair operation likely to be encountered in the maintenance of cars and trucks. The line shafting is mounted on ball bearing hangers and consequently a 5-6 hp. motor is sufficient motive power for the shop. The lathes are provided with tool trays and bins, racks on the wall, chucks and steady rests. There is a place for everything and as mentioned before, when 5 o'clock comes everything is in its place and the shop appears as though there had been a holiday period declared.

The overhead carrier system has been laid out to conform with the placement

of cars while in the shop, so that no matter whether a rear axle or engine is to be removed, the car will not have to be shifted to fit the carrier system. Reference to the floor plan will make this clear. A track runs into the stock room. The stock room, as will be noted, has been centrally located and is thus accessible to shop, salesroom and service department alike.

At one end of the machine shop is a complete electric department for work on generators, starting motors and other electrical equipment. The company feels that by having on hand a man who devotes all of his time to the electric work, it is in the best possible position to render efficient service to its patrons. In addition there is a battery department in the basement where batteries are charged and to a certain extent rebuilt. It is not a complete battery shop, but affords facilities for the more immediate maintenance operations.

The general layout of the building was planned for a period of several years and the company states that were it to build again it would make no basic changes. The general plan has worked out so well in practice that no changes are contemplated. In short, it is a building designed and built for the best possible arrangement for selling cars and trucks and their maintenance. But, when you have in addition to this, a desire on the part of the institution to make its services as nearly faultless as possible, to present to its patrons a well-groomed place of business and to keep everything in harmony with the dignity

of the car sold, you can readily see why it is possible to grow enthusiastic over this organization.

MERCHANDISING PROFITS

A trade report says—"the call for bumpers is the largest on record and this piece of equipment is selling more rapidly than it can be produced."

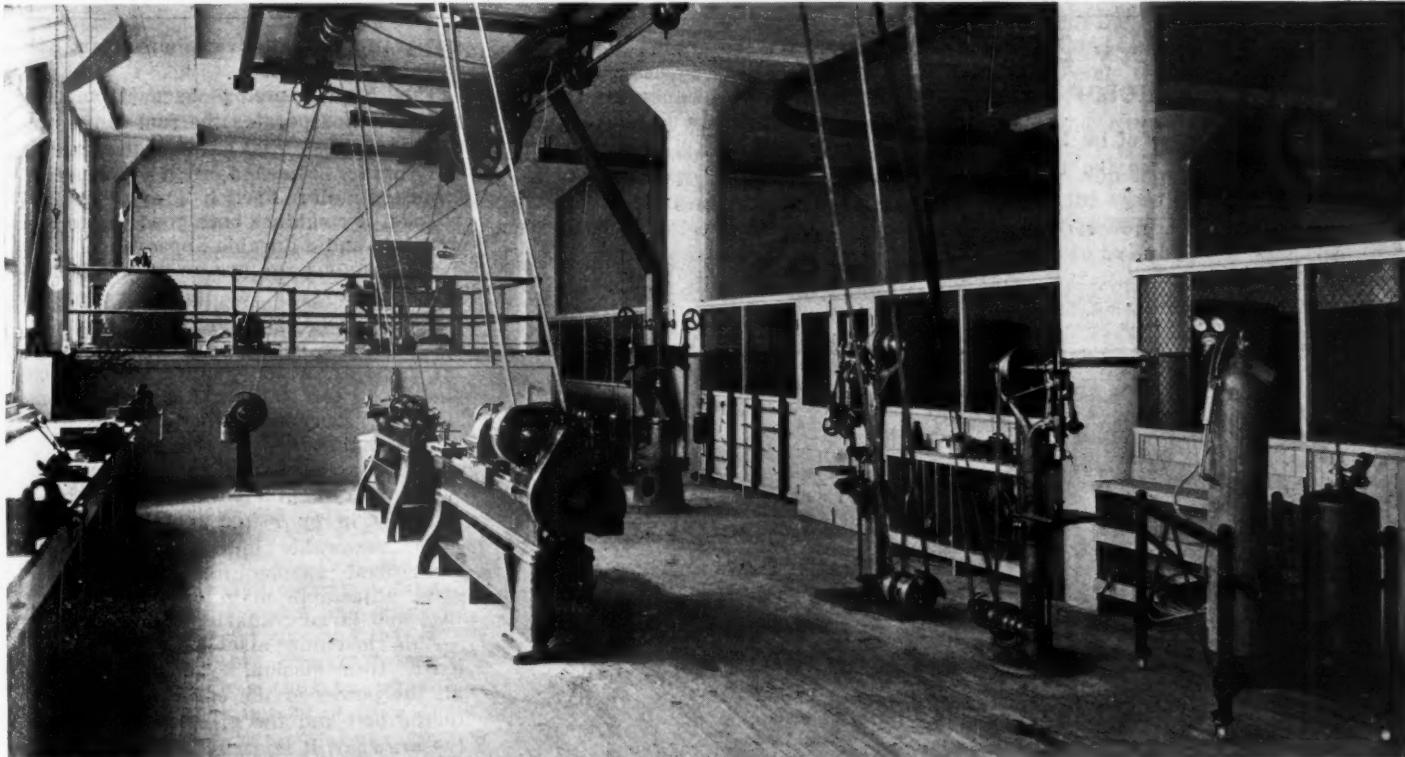
Probably there are a number of cars belonging to your customers that are not equipped with bumpers. Possibly the owners think they do not need them. Then it is up to you to show them why they do. Look at the fenders of their cars—usually they will show the scars of past bumps. That is all the proof you need. Sell them the bumpers they need.

Perhaps your jobber can supply 10 bumpers packed in a shipping case, as recommended by the Standardization Committee of the Automotive Equipment Association. But figure a bit before you buy. Not all cars can use the same type of bumper. If there are only 7 cars on your list that can use a certain type and you do not know of any other market for that type, it would be a serious mistake to buy 10 of that type. Three of them would be dead stock and you would lose most of your profit. Here is the way it would appear on the books.

10 Bumpers at \$10 each—cost \$100.

7 Bumpers at \$15 each—sell for \$105.

You have only \$5 profit and 3 useless bumpers to show for your effort. If you sold the other 3 at \$15 each, they would bring you \$45 more. Selling those last 3 bumpers makes the transaction pay.



Machine shop of the American Automobile Co. It is considered one of the cleanest and best equipped shops in the country. The floor is of hard wood and kept spotlessly clean at all times. It is an inspiration to those who seek to improve their own shops

New Trucks and Tractors

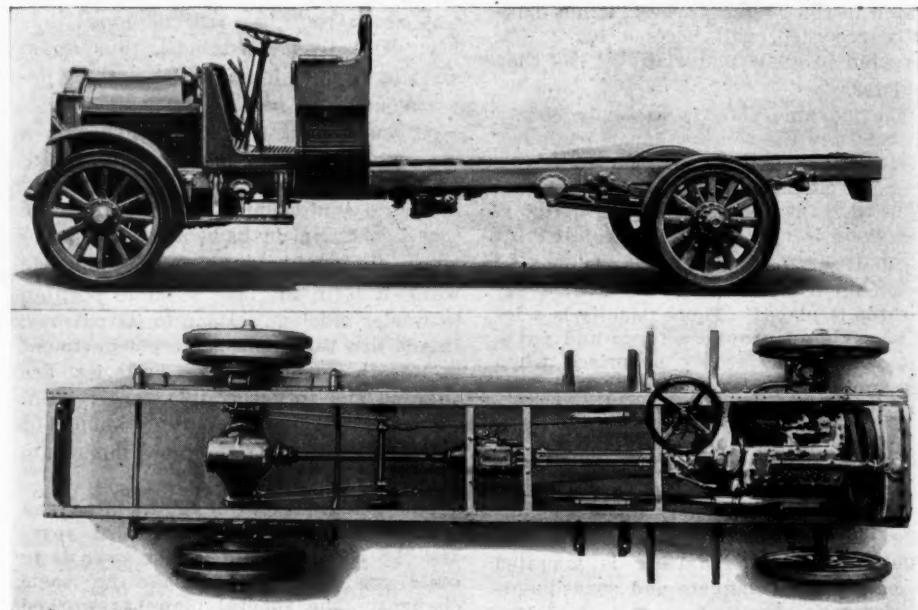
Federal Adds a 4000-5000 Lb. Truck

A new 4000 to 5000 lb. capacity truck has been added to the Federal line under the model number U-2. This chassis will be made up in three wheelbase lengths, the shortest being 12 ft., the standard 13 ft. and the longest 14 ft. It will be provided with a short or dumping loading space of 110 in., standard 134 in., and the longest 158 in. On this chassis, a body allowance of 1500 lbs. is made.

The chassis is equipped with a Continental K-4 engine, this being a four-cylinder, vertical, L-head mono block type with a three-bearing crankshaft. It has a bore and stroke of $4\frac{1}{8} \times 5\frac{1}{4}$ in., and a 35 hp. output at 1300 r.p.m. The truck is fitted with an Eisemann G-4 high tension magneto, Zenith carburetor, Pharo centrifugal oil type governor, Borg & Beck clutch, Detroit Gear & Machine Co. gears and the front axle is Federal design and manufacture and the rear axle Timken-Detroit.

The clutch is provided with four forward speeds and one reverse, the ratios in the gearbox being 5.899 to 1; 3.206 to 1, 1.752 to 1, and direct on fourth. The reverse is 7.078 to 1 and the final ratio at the rear axle is 7.75 to 1 on the standard truck with 8.5 and 9.25 optional.

The chassis follows the usual lines, the transmission being mounted as a separate unit with divided propeller



shaft and four Spicer universal joints. The truck propels through radius rods with the torque taken through the springs. The tire equipment includes 36 by 4 front, 36 by 7 single or 36 by 4 dual rear. The steering gear is a Gemmer with 18 in. hand wheel. The gasoline system is provided with a 20 gal. tank mounted on the chassis frame under the seat and the fuel feed is through a Stewart vacuum system.

The frame is pressed steel, channel

section, 6 in. deep, $\frac{1}{4}$ in. section and 34 in. wide. The height of the frame from the ground when loaded is 29 in. front and 30 $\frac{1}{2}$ in. rear. The chassis is lubricated throughout by the Alemite system. Electrical equipment provides Remy electric generator, electric side, tail and instrument lamps, ammeter, horn and Exide special truck battery provided with cushion mounting on frame brackets. The Remy electric starter is optional at an additional price.

Improved Avery 20-35 H. P. Tractor

As one of the features of its 1923 line, the Avery Co. announces the improved 20-35 hp. tractor.

The external appearance of the ma-

chine shows the most noticeable change, for the improved 20-35 has a decidedly more attractive appearance for 1923. It shows modern tendency in tractor design to preserve as far as possible clean simple sweeping lines. The cab has been eliminated, the fenders cover the full width of the rear wheel and extend from

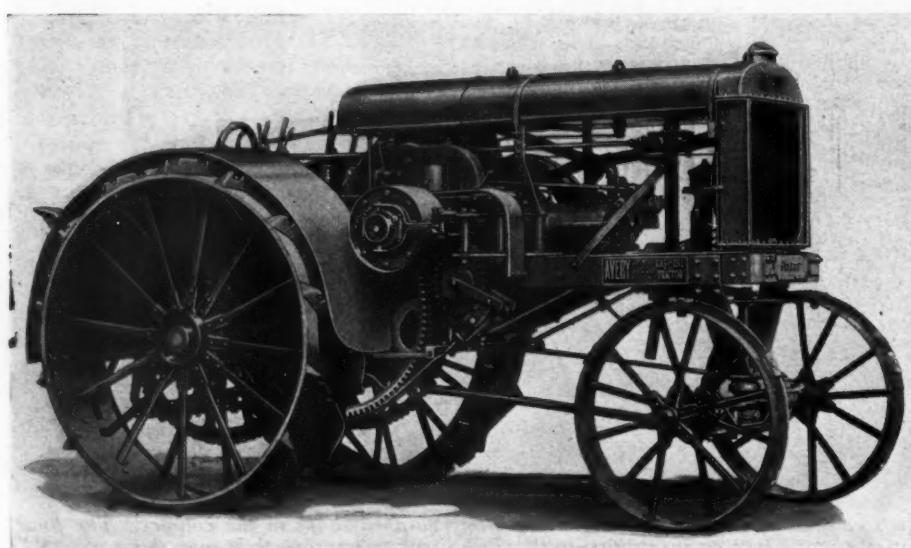
the platform well over more than half their circumference.

The hood running back from the radiator incorporates the fuel tanks and affords a substantial cover protection for the engine. Finished in the new Avery standard color French grey with red wheels, it combines both good colors and a simple and a durable appearance.

Chief among the improvements in this model Avery are the increasing of the power of the engine by 25 per cent, the adoption of a cooling system with cellular radiator, water pump and fan, also the use of the Madison Kipp mechanical lubricator for oiling the working parts of the engine.

This tractor has a four-cylinder opposed Avery engine with bore and stroke now $4\frac{1}{8}$ in. by 7 in. It has valves-in-head, renewable inner cylinder walls, centrifugal gasifier for burning kerosene, adjustable main crankshaft bearings and large crankshaft.

This machine also has the "direct-drive" transmission, by means of which all the power of the engine is delivered to the belt and the greatest per cent in the drawbar, it is stated. The weight of this tractor is only 7500 lbs., making it one of the lightest weight tractors per drawbar efficiency.



New Series Locomobile Announced

A NEW series of Locomobile known as Series 8 has been announced. The general features of the car remain the same but important changes have been made in numerous details. Some of the characteristic features of the Locomobile are the six-cylinder, low speed, side valve engine with a bronze crankcase and cylinders cast in pairs; a full-floating rear axle with radius rods and torque arm, and double brake drums on the rear wheels.

An important change is the adoption of battery instead of magneto ignition. The system adopted is the Delco dual system, consisting of two independent units, each with its own coil, breaker and distributor. With this system two sparks are produced in each cylinder at different points of the combustion chamber, thus ensuring more rapid combustion.

The two sparks are purposely not synchronized, that over the exhaust valve being set to occur from 5 to 7 deg. earlier than that over the inlet valve, this having been found to prevent detonation. A wider speed range on high gear and more silent operation are claimed as other advantages resulting

from the use of the new ignition system.

A new camshaft drive has been adopted, comprising camshaft gears of a new non-metallic material known as Textoil, manufactured by the General Electric Co. The cams have also been redesigned and the pitch of the inclines so altered that their operation is noiseless at all engine speeds, it is claimed.

Numerous minor changes have also been made in the engine. The pistons are now given greater relief, and the piston pins are secured in the piston bosses by a single pin screw extending all the way through the piston boss, instead of by two screws, as has been Locomobile practice in the past. The oil reservoir is now cast integral with the engine.

Slight modifications have also been made in the carburetor and its connection to the engine. The inlet manifold is now hot water-jacketed and is so connected to the engine cooling system as to induce a powerful circulation of hot water through the manifold jacket.

The clutch is a new design of the dry disk type. The driving set of disks is made of molded Raybestos and one set of metal disks is thus eliminated. Right

within the clutch is a Thermoid fabric universal joint which tends to prevent chatter of the clutch due to periodicity of the universal joints in the final drive. The pressure required to release the clutch has been reduced.

For the gearset the Locomobile company has adopted the Maag system of ground gears. These gears are used for the constant mesh, the reverse and the third speed set, the latter being the pair most used of the intermediate gears. A splined shaft has been substituted for the square shaft heretofore used. This splined shaft is ground on the sides and at the bottom of the splines, which, of course, tends to insure accurate mesh of the gears.

Improved riding qualities are provided by a change in the spring design, whereby an increased number of leaves are provided in the springs. Each front spring has 16 leaves of varying gage, while the lower part of the rear springs has 11 leaves of the same character.

There has been no change in body styles. The chassis price is \$6,800, while car prices range from \$7,600 for the touring car to \$11,000 for the sedan.

Longer Engine Life Through Application of Timely Accessories

That the all-important subject of engine longevity is receiving more and more attention these days is exemplified not only in the design and construction of engines but in the thought being placed behind many engine parts and accessories recently placed upon the market. Three such items which have appeared of late give some idea of the tendency of certain manufacturers to bring out products designed primarily for getting better engine operation and resultant longer life.

These three things are a new piston, an oil signal and a hot spot, the latter intended for Chevrolet engines in which the intake manifold is quite long.

The piston is made of an aluminum alloy and cast iron, and has been brought out by the Muskegon Motor Specialties Co. under the name Thermolite. It is a replacement proposition.

The aluminum alloy composes the central part of the piston head and the ribbing extends down from the head and includes the wrist pin bosses, so that the explosion thrust is taken entirely by the aluminum part of the piston and transferred by it to the wrist pins and thence to the connecting rods. The cast iron part simply acts as a sealing and guiding member. The upper part of the cast iron section of the piston carries the piston rings and the piston skirt acting as a guide is an integral part of this casting.

An ingenious locking device is utilized for locking the two portions of the piston together. It consists of a drawn steel split collar with reinforcing webs for strength and to receive the spanner wrench. The lower face of the locking collar has twelve inclines or cam faces which engage twelve cam faces on the iron skirt and when locked and pinned, constitute a positive lock.

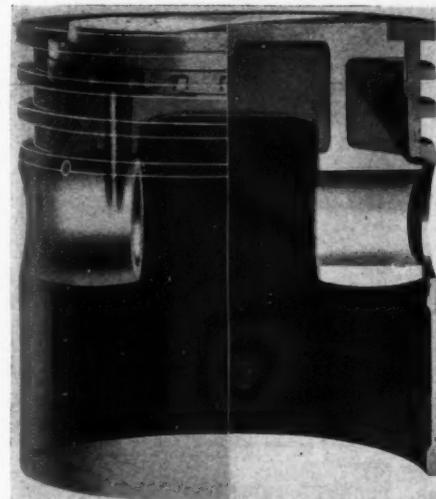
It is claimed that these pistons weigh from 25 to 40 per cent less than the cast iron. They are also claimed to have particular advantages as regards thermal efficiency, in that the heat radiation of the aluminum head is three times as great as that of iron, resulting in a cool

headed piston and helping to eliminate a large percentage of engine knocks or "pink."

Another claim by the manufacturers is that of long life due to the fact that iron is in contact with the cylinders and rings. A gain of lightness is made since it is possible to use a wall of iron only 3/64 in. thick, because the iron does not receive any of the actual driving stresses. A simple radial ribbing is used on the skirt, this being made possible by supporting the pin bosses from the aluminum head and, consequently, cannot distort the skirt even through direct stress due to explosion impulse, or by the expansion of the mass of metal necessary for the formation of the piston pin boss.

Provision is made for the difference in the coefficient of expansion of the aluminum head and the iron skirt to prevent any strains or undesirable stresses. A particular feature which may be noted is that none of the explosive pressure is transferred to the locking device, but is carried directly on the shoulder. The cost of the piston is less than the all aluminum and slightly more than the all iron.

With the general adoption by engine makers of the pressure system of lubrication, one maker of engine accessories has seen fit to bring out a signal, which, in a measure serves the same function as the usual oil pressure gage. However, the apparatus is more of a warning device for the driver, than an instrument for recording varying degrees of oil pressure. It serves its purpose best when used in conjunction with the ordinary pressure gage.

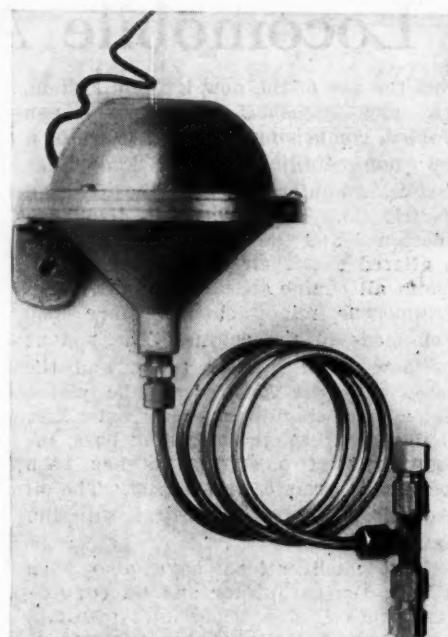


A sectional view of the Thermolite composite piston

This device, called the Elgin Automatic Oil Signal, incorporates a ruby lamp mounted on the instrument board of a car. Under normal conditions and when the engine is running the lamp will not burn, but should there be any falling off in pressure, the lamp will immediately flash on. The makers, The Elgin Auto Tool Co., Elgin, Ill., also state that in experiments it was shown that when the oil in the crankcase gets very thin and the resultant pressure on the oil becomes low, the lamp will glow faintly, thus warning the driver that the oil in the engine should be replaced with new.

Essentially the device consists of thin brass diaphragm properly supported in an aluminum housing, which is installed on the engine side of the dash. A tube connects the device with the pipe running from the oil pump to the oil pressure gage. Under the semi-spherical cover are two electrical contacts, forming in reality a switch for the ruby lamp, which are closed when the engine is not operating and there is no pressure on the diaphragm. With pressure on the latter, the two points are separated and, of course, the ruby lamp does not burn. Electrical connection is made to the ignition terminal on the lighting switch of the car and there is thus assurance that the lamp always will work, so long as the engine will run. The lamp flashes on when the switch key is inserted, but goes out immediately the engine starts.

In keeping with modern tendency to get as much heat as possible to the fuel, the Losee Motor Products Co., Hebron, Ill., has brought a hot spot for Chevrolet engines. This hot spot applies heat directly at the point where the vertical intake pipe from the carburetor joins the horizontal branch leading to the cylinder ports.



To guard against danger from lack of oil pressure, or too thin oil, the Elgin Automatic Oil Signal flashes on a ruby light on the instrument board

The device is made in halves and simply clamps around the manifold, being held in place by four screws. Heat is furnished from the exhaust manifold through a double interlocked flexible tube, it being necessary only to drill a $\frac{1}{4}$ -in. hole in the manifold and tap with a standard $\frac{1}{2}$ -in. pipe tap for a street elbow. Another street elbow slips into this and is fastened by a set screw.

The installation provides for the suction pipe from the vacuum tank, through the boss cast integral with the aluminum halves. When no suction pipe is desired, a small button closes the opening at the

top of the boss. The whole installation requires about one-half hour and the makers state a cold engine thus fitted will warm up within four average city blocks.

Some maintenance men seek to reduce the warming up time of engines by fitting larger jets in the carburetors of such engines. This not only is wasteful of fuel, but means the oil in the crankcase will be materially thinned after a short period of running. A far better procedure is to seek a means for warming up the incoming charge more rapidly. Most of the damage to engines, as regards raw fuel finding its way to the crankcase oil, is done during the warming up period. Hence any device which furnishes heat to a strategic point on the intake manifold and which utilizes heat from the initial explosions of the engine is quite sure to be of benefit.

Doing One Thing Well

At this time of the year we see many signs in the dealer's window advertising the fact he has alcohol, glycerine or some other kind of anti-freeze for sale.

Like many other things there is a right and wrong way to sell a car owner anti-freeze preparations. It does not matter a great deal whether you sell him denatured alcohol, a combination of alcohol and glycerine or one of the proprietary compounds on the market. It is how you sell him.

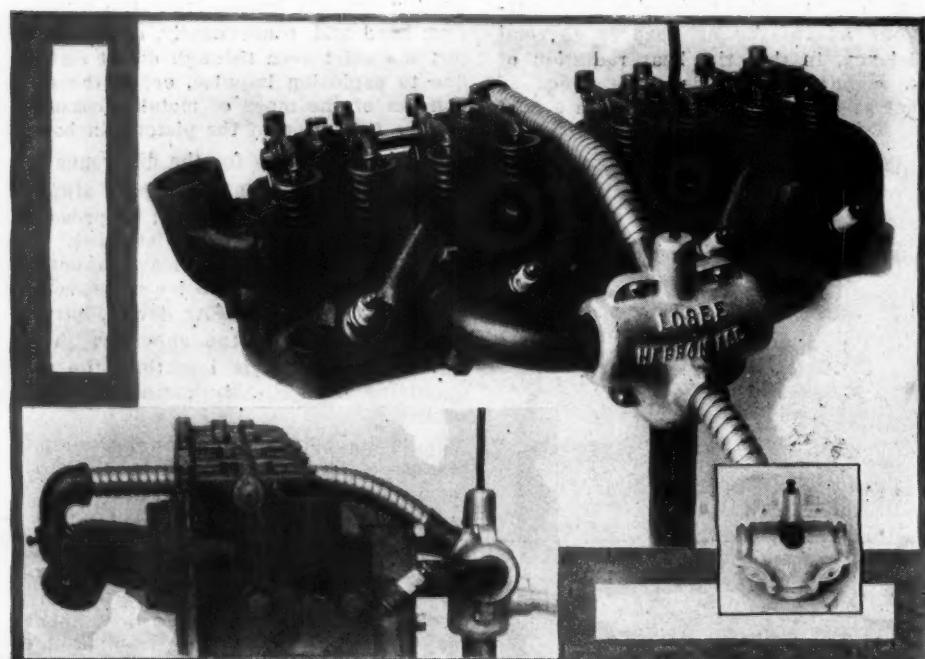
No dealer's maintenance department should sell anti-freeze to a customer until assurance has been made that the water system of the customer's car is in good shape to receive it. Think what it means to sell a man alcohol, dump it into his radiator and send him away only to have him call you up that his radiator is split open from a heavy freeze. His engine had leaky hose connections and most of the alcohol leaked away with the water and he thought all the time he was insured against damage from freezing.

When the customer says anti-freeze, lift the hood of his car and make an inspection. Maybe the water pump packing needs replacing, new hose is necessary or maybe the radiator needs soldering. Whatever it is, call the customer's attention to it and see that these things are in order before the non-freeze preparation is poured into the system.

Incidentally, if you are handling an anti-freeze compound make sure it is one which has no corrosive action on the radiator and engine water jacket.

Columbia University to Teach Motorists

Columbia University in its Extension Department has started a course in automobile engineering, aiming to give the motorist a working knowledge of the internal combustion engine, according to a report in the New York Times. Frederick H. Dutcher of the School of Engineering will conduct the course.



The Losee hot-spot for Chevrolet engines. It provides heat from the exhaust to the junction of the horizontal and vertical branches of the intake manifold

Steps Taken Toward Standardization of Automotive Mechanics Study Courses

All Day Conference of Educators in Detroit Results in Federal Board of Vocational Education Undertaking to Bring Order Out of Present Chaos

By CLYDE JENNINGS

AS a result of the educational conference at the Hotel Tuller in Detroit on Wednesday, Nov. 29, the Federal Board of Vocational Education will undertake to establish a contact between those interested in automobile mechanical education and the automotive industry. The objective of this contact is to learn from the industry:

What the industry wants and expects from the automobile mechanical schools.

The conference was called by the Federal board during the regional conference on vocational education and this one session was set apart for the discussion of automotive educational problems. Seventy educators and representatives of the industry registered and it is known that several were present whose names are not on the list. Practically all of those present spoke during the day. The session was originally called for a half day conference, but did not adjourn until 5 p. m., with a short intermission for lunch.

Frank Cushman of Washington, chief of the Industrial Education Service, presided and directed the discussion along progressive lines. J. C. Wright, director of the Federal Board of Vocational Education, was present much of the time and personally accepted the task of forming the contact as outlined in a resolution quoted later.

As a basis for discussion, the Federal board presented 14 topics. These pertained to the construction of the present courses and the future course. There was no effort to record the expressions on these topics and at the end of the day many of them were unanswered, but a sufficient expression of opinion had been obtained to enable the meeting to draft an answer to the general question:

What is the status of the automobile mechanical schools of today?

At the close of the day, the Federal board members felt they had acquired sufficient information as to the present status ideals and possibilities of existing schools to get a basis of comparison with the ideals that may be set up for the industry.

As a plan for the work after the comparison of ideals is worked out, the recent accomplishment of the Horological Institute was outlined. Briefly, it is this:

The watch manufacturers and repairmen of the country became dissatisfied with the results of the watchmaking schools of the country and called a meeting to consider the proper development of the educational work. This conference was carried to the Bureau of Standards and three courses of study were defined with a view of establishing certain standard of craftsmanship for the graduates of the schools. As a result, the various schools have conformed with these requirements and now a school mechanic goes to his future employer with a fairly accurate guide as to his status in the craft.

A practically unanimous opinion was expressed that some such standard might be worked out for the automobile mechanical schools. The questions upon which the day's discussion was based were as follows:

Federal Board for Vocational Education

CONFERENCE ON TRAINING AUTOMOTIVE MECHANICS, DETROIT, MICHIGAN, NOV. 29, 1922

Points for Discussion

1. For what type of automotive repairman is there the greatest demand—assemblers who have learned how to install repair parts or mechanics who have higher qualifications?
2. Is any general machine shop experience an asset to a prospective automotive repairman?
3. Which of the following lines of mechanical work would in your opinion have a value in training automotive mechanics—blacksmithing, foundry work, sheet metal work, machinists' bench work, including chipping, filing, scraping, lining up, small assembly work, etc.?
4. Is it necessary or desirable for an automotive mechanic to know something about the properties of iron, steel, brass, aluminum, and other metals?
5. Is it sufficient that a man have information in regard to heat treating steel, or should he have ability to do the work?
6. Should a student in an automobile school or course be taught anything about the commercial or business side of the garage business?
7. To what extent should specialized lines, such as gas welding, radiator re-
- pairing, tire work and storage battery work, be included in a general course?
8. Should the school shop be equipped with highly specialized machinery and tools, or should the boys learn to work with the type of equipment they will probably find in an ordinary garage or service station.
9. To what extent should technical courses in related science, drawing and mathematics be considered an integral part of a course of instruction? What should be the nature of the subject matter of such courses and upon what should it be based?
10. The statement has been made that an important part of the training of a welder is the development of a "job conscience." If a similar qualification is a good thing for an automotive mechanic, how can it be developed?
11. Is it practicable to give shop training on repair work to beginners in evening classes, or should evening courses be made available only to those who have a chance to secure shop experience on the job as a part of their regular work?
12. Can automotive mechanics be adequately trained in a six weeks' course, starting with men of little or no mechanical training?
13. Are there certain phases of training which an automotive repairman should have that can be given to better advantage in the outside garage or service station than in a school shop? What phases of the work can better be given in a school?
14. If job specifications and training standards are deemed desirable for the automotive repairman, what agency could best assume the responsibility for setting up such standards and specifications?

As has been said, these questions were not answered directly, but several interesting points developed and from the discussion it was evident that every educator present felt that his course was not perfect, that he would be called upon to make changes at the first opportunity.

The first question brought out one phase of the problem that was in evidence all day—that most of the educators have based their plans for educating men for the maintenance industry

on the larger city shops and as a result their students were not best equipped for work in the smaller shop. The answer to No. 1 appeared to be that the school should spend much time on fundamentals and theory, rather than on finished practice and that a man should not be specialized until he is trained in the fundamentals.

No. 2 brought out that not all of the educators had a vision of the community repair shop that the automotive maintenance shop must develop into, where all sorts of mechanical equipment for the home and farm must be serviced. After some discussion it was rather accepted that at least 10 per cent of the student's time should be devoted to machine shop work.

This discussion also brought out the fact that some schools were giving men specialized work in machine shops, foundry and other related branches because the school had the equipment for this work. The thought entered that this was a good thing to do in most cases, but that the automotive students should be in a special class under automotive instructors, while working in these highly specialized departments of the school.

No. 3 was accepted with the suggestion that foundry and chipping be dropped and the other specialties be taught under automotive auspices. Here developed another interesting point. Many of the educators included all cold chisel work in chipping rather than under bench work.

As an answer to No. 4, the feeling was that the student should know enough about the metals to know what tools to use on them and the student should be taught to know how to develop a subject of this sort from books of reference.

As to heat treating, the subject of No. 5, it was the conclusion that the student should be well drilled in the simpler processes, such as tempering tools and forge processes of heat treating and that he should know enough of the theory to know that the engine block, after being used for several months, has become well heat treated. As to electrical furnace work and other production propositions, he should be taught only the theory and accuracy necessary. A subject for intensive work was the recognition of heat treated work and the processes for repair.

No. 6 brought out the fact that all schools are developing this side of the educational work and find that it has brought good results. It was urged on the educators that they should go thoroughly into the side of finances that make for the contentment of the mechanic and should drill him on the fact that when he is paid 60 cents an hour and his employer charges the public \$1.25 for that work that the 65 cents difference is not all profit to the employer.

No. 7 developed what seemed to the practical men present a rather curious point: That some schools were considering battery and ignition instruction as entirely independent subjects. It was

brought out that in most shops the ignition and electrical trouble man was also the battery man and he should know well fundamental battery subjects and repairs. The other subjects were designated as specialties and it was the consensus of opinion that all should be taught to some extent to the general student and the extent of this instruction should be coordinated to the length of the course.

Beyond this point there was no definite discussion of the questions, as the discussion had broadened to a point where it seemed to all present that a sufficient understanding had been obtained to bring about a definite step for the future development of the entire educational plan. At this point a committee of resolutions was appointed, consisting of F. C. Smith, national director of Y. M. C. A. automobile schools; L. A. Emmerman, superintendent of vocational education in the Joliet, Ill., schools, and Clyde Jennings, editor of MOTOR AGE, which reported as follows:

Resolution

Be it resolved, that it is the consensus of opinion of the conference held in Detroit, Mich., Nov. 29, 1922, for the purpose of considering job specifications and standards of training for automotive repair men, called by the Federal Board of Vocational Education and participated in by representatives of state departments of vocational education, representatives of the National Automobile Chamber of Commerce, the Society of Automotive Engineers, public schools, the Y. M. C. A., the K. of C., private automotive schools, automotive manufacturers and other automotive interests, that, as at the present time, there seem to be no adequate standards of training for this important and rapidly growing phase of the transportation field, and as some adequate standards are greatly needed, that the Federal Board for Vocational Education is urgently requested to give active consideration to the problem and to make contact with such national organizations in the automotive industry as have a common interest in the problem, to the end that some agreement may be reached which will function on a national scale for improving the training of repair men for the automotive industry and the upgrading of those in service in this field.

Be it further Resolved, that copies of this resolution be sent to each of the members of the Federal Board for Vocational Education.

The resolution was enthusiastically adopted and Director Wright accepted the assignment. He said that it was his belief that this movement would fit into other work under way by the board and that it was of great industrial importance that the education should be adjusted to the practical needs of the industry and in this way gain the confidence of the industry.

There were a number of interesting sidelight discussions during the day.

From the representatives of industry present, the cooperation of the existing industrial organization was pledged. These associations were represented as being anxious to help the educational facilities now established to become as useful as possible.

F. C. Smith, of the Y. M. C. A. schools, said that he was strong in the belief that this was primarily a public school work and that it should be transferred from the private or semi-private schools because it was one of the greatest needs of the country today, as a proper support of the new form of transportation was an absolute economic necessity and the fact that such a move would wipe out his job was no concern to him. He and T. H. Nelson, assistant executive of the Y. M. C. A. schools, told of a three year effort to standardize the courses in the 80 Y. M. C. A. schools, an effort similar to the work now being undertaken for all schools.

It was also brought before the conference that perhaps the greatest single task before the educators was that of properly presenting their work to the maintenance dealers and foremen of the country so that their students would be properly accepted in the shops. It was said that the presentation to date had rather been an overselling of the students; that the graduated students were not often fitted to take places as experienced mechanics and that the entire educational movement had suffered by the extravagant claims of a few schools that so represented themselves, rather to gain students than with regard to what became of them afterward. These schools, it was represented, by short courses and bargain advertising, have turned out more "graduates" than the ethical schools and consequently had done more to discredit education than the better schools were able to overcome.

It soon became the belief of those present that the problem was a bigger and broader one than they had previously considered it, each looking at it from his particular point of view, and that a standardization and a statement of possibilities was the first requisite.

The matter of establishing a definite course of study was not referred to definitely, but it was easy to see that a ground work for this movement had been established and that it will be developed as soon as the comparison of ideals is obtained by the Federal Board of Vocational Education as a basis.

There was plenty of evidence in the discussion that the commercial side of the problem had not been much considered by the educators as the present most important phase of the work. Also many of them spoke of the trouble shooter as sort of necessary evil and a man without a definite place. It seemed to be brought home to many of those present that the present status of mechanical work within the shop was a much higher order than its presentation to the public, that the maintenance

salesmen and the trouble shooter must be of the highest type and most versatile of mechanics and this work should be held as the goal of all mechanical students who wished to succeed.

The attendance at this conference was surprisingly good for a first meeting. The interest could not be improved upon. The type of educators who are interested can not be better stated than by publishing a list of those present. They were:

A. H. Whitesitt, Pittsburgh, Kans., Dir., Ind. Educ., State Teachers' College.

F. C. Smith, New York, Nat'l. Dir., Y. M. C. A. Auto Schools.

Harold Diemer, Joliet, Ill., Dir., Part Time Education.

A. O. Merrill, Hammond, Ind.

J. C. Nichols, Cleveland, O., Dir., Y. M. C. A. Trade School.

H. B. Knap, Detroit, Mich., Member, S. A. E.

G. A. Gastineau, Detroit, Mich., Member S. A. E.

A. G. Zeller, Detroit, Mich., Pres., Mich. State Auto. School.

H. A. Zeller, Detroit, Mich., Princ., Mich. State Auto. School.

R. T. Guyer, Muskegon, Mich., Automobile Dept.

Thos. Diamond, Ann Arbor, Mich., U. of Mich.

Geo. E. Myers, Ann Arbor, Mich., U. of Mich.

F. A. Ringler, Chicago, Ill., Gen. Manager, Greer College.

E. R. Langley, Washington, D. C., U. S. Veterans' Bureau.

M. H. Doeberl, Buffalo, N. Y., Instructor Elm Vocational School.

Wm. B. Kamprath, Buffalo, N. Y., Princ., Elm Vocational School.

B. T. Leland, Providence, R. I., State Superv. Ind. Educ.

G. M. Quackenbush, Buffalo, N. Y., Buffalo State Normal School.

Paul S. Hamilton, Detroit, Mich., Cass Tech.

Jas. F. Guild, Boston, Mass., Educ. Superv., K. of C.

John J. Cummings, New Haven, Conn., Educ. Dir., K. of C.

H. F. Good, Menominie, Wis., Instructor, Stout Institute.

Clyde Bowman, Menominie, Wis., Dir. Ind. Dept., Stout Institute.

H. G. Martin, New Orleans, La., Dir., Delgado Trade School.

J. F. Kolb, Springfield, Ill., Supt. Ind. Educ. for Ill.

H. A. Tiemann, Washington, D. C., Fed. Agent, F. B. for V. E.

V. M. Russell, Platteville, Wis., Instr., State Normal School.

Dean M. Schweikardt, St. Paul, Minn., State Supt. Trade and Ind. Educ.

F. E. Searle, Detroit, Mich., Supt. Ford Schools, Ford Motor Co.

Jas. McKinney, Chicago, Ill.

Chas. L. Conroy, Manitowoc, Wis., Instructor, Mechanical Drafting.

C. E. Hayden, E. Chicago, Ind., Dir. Voc. Educ., Public Schools.

C. M. Hewitt, Peoria, Ill., Bradley Institute.

J. F. Parker, Portland, Me., Head Vocat. Dept.

H. L. Pride, Augusta, Me., State Supt. Trades and Industries.

Clyde Jennings, Chicago, Ill., Motor Age.

L. A. Emerson, Joliet, Ill., Supr. Vocat. Educ.

M. T. Steffen, Buffalo, N. Y., Instructor Elm Vocat. School.

L. D. Althouse, Detroit, Mich., Cass Tech.

E. R. Allanson, Detroit, Mich., Cass Tech.

H. L. Briggs, Cleveland, Ohio, Voc. Dir.

M. A. Barney, W. Medford, Mass., Superv. State Dept. Educ.

M. Stratton, Boston, Mass., Agent, State Dept. Voc. Educ.

O. K. Moulton, Fall River, Mass., Dir. Vocational School.

B. H. Morrison, Carson City, Nev., Dir. Voc. Educ.

J. W. Barratt, Philadelphia, Pa., Supt. Apprentices, Westinghouse Co.

G. A. McGarvey, Washington, D. C., Fed. Agent, F. B. for V. E.

J. M. Sterling, Toledo, Ohio, Voc. Dir.

A. S. Barr, Detroit, Mich., In charge of instruction.

Chas. A. Wardner, Jackson, Mich., Voc. Dir.

Eugene D. Fink, Albany, N. Y., Specialist in Ind. Educ.

Oakley Furney, Albany, N. Y., State Educ. Dept.

R. H. Rodgers, Albany, N. Y., State Educ. Dept.

T. H. Nelson, New York, Asst. Exec. Sec'y, Y. M. C. A. Schools.

Albert Feitsch, Gary, Ind., Asst. Ind. Dir.

H. J. Jameson, Worcester, Mass., Dir. Boys' Trade School.

K. G. Smith, Lansing, Mich., State Supt. Ind. Educ.

A. B. Anderson, Wilmington, Del., State Supt. Ind. Educ.

D. R. Hoover, Ann Arbor, Mich., Instructor, U. of Mich.

H. J. DeYannett, Hampton, Va., Supt. Trades.

P. C. Molter, Chicago, Ill., Supt. Dept. Educ., Nat'l. Metal Trades Assn.

G. F. Buxton, Indianapolis, Ind., Professor, Indiana U.

O. H. Turner, St. Louis, Mo., Asst. Supt. Ranken Trades School.

J. F. Arundel, Cincinnati, O., Dir., Voc. Educ.

K. A. Moore, Detroit, Mich., N. A. C. C.

C. F. Worfolk, Detroit, Mich., Mich. State Auto School.

E. L. Dudley, Detroit, Mich., Cass Tech.

J. E. Fults, Springfield, Ill., Asst. State Supt. Ind. Educ.

C. F. Kleinfelder, Washington, D. C., Fed. Agt. F. B. for V. E.

23 Years Ago This Week In Motor Age

(From MOTOR AGE of Dec. 7, 1899.)

New Duryea Company

A dispatch from Peoria states that incorporation papers of the Duryea Motor Co. were filed in New Jersey on Nov. 28. The capital stock will be \$1,000,000, of which \$100,000 will be 6 per cent preferred stock. The company has purchased the patents of the Duryea Mfg. Co. of that city. Henry Crowther of New York City is president, and Charles E. Duryea vice-president and chief engineer. All of the stock has been underwritten. The company will erect a large factory in the east in addition to the one in Peoria.

Notes of Interest

Postmaster Hess of Indianapolis has joined the number of postal authorities who are enthusiastic over the subject of the auto for handling the mails. He has been endeavoring to get the Washington authorities to permit him to carry on experiments at the Hoosier capital.

The English Motor Car Club held a run from London to Brighton recently. The distance is 52 miles, over good roads. More than 115 automobiles started. They

included phaetons, busses, cabs, wagonettes and even the 1½ h.p. tricycle was represented.

The Riker Electric Vehicle Co. has contracted for nine spaces at the New York automobile and cycle show.

Traffic Problem Is Now New

A page article was devoted to criticisms of the automobile. An editorial from the Chicago Journal was quoted in part as follows:

"The best way to lose a privilege is to abuse it. If drivers of automobiles are to be allowed the free use of the streets they will have to be more considerate of others' rights and more observant of the rules of the road than some of them are at present. Otherwise there is danger of a public demand for their suppression. If automobiles are to be run like traction engines, they ought to be treated like traction engines—kept off the streets. If their owners intend to use the streets they should be compelled to conform to the rules that other people who use the streets have to keep. The fact that they are an interesting novelty doesn't give them any more rights than other vehicles."

Sell for Profit

SELLING goods just for the sake of selling goods with no discrimination as to whether sales are profitable or not, doesn't make much of a hit with me," says W. R. Powell, of Powell & Williams, Buick dealers at Albia, Ia.

"I used to haggle, but I don't any more. When a buyer comes in here and tells me that he can buy elsewhere a certain accessory, let us say, for less money than I ask, there's no further argument. Right then and there I tell him that the other place is the place from which to buy. Every accessory we have here is of standard make, has quality and must be sold on a quality basis, and on that basis every item in our stock is priced fairly and yields us only a fair profit at the best.

"Unless we can get our price, we can't get our profit, and somehow I am obsessed with the notion that it's bad business to sell without a profit. So I don't argue nor 'chew the rag.' If the buyer don't want to pay my price he has the privilege of buying somewhere else and I let him do it. Life's too short to do business just for the sake of selling something and as for me I simply won't do it, that's all. Maybe that's one reason why I still am in business, for I've seen a lot of them come and go since I started."

Adding Color to the Salesroom

Some Suggestions for a Christmas Display Space

HAVE you been a bit puzzled as to the kind of decorations you are going to use to make an effective setting of your establishment for an automotive Christmas? If so, you will probably find some of the suggestions contained herein applicable to your case. None of these ideas will take a skilled interior decorator to work out, nor will they cost you a lot of money—just a few plain words on what will help you to save and keep you right on your scheme.

Paul A. Miller, who does a great deal of Christmas work for Chicago business houses, has contracted this year to dress some automobile show rooms on Michigan avenue and has completed his plans for them. "One dealer," says Miller, "has paid me nearly \$5000 to decorate his main and outlying stores, but I doubt if there are many who want to go in for such a large amount of money. Of course, this man is getting the very best and, I hope, in fact, I might say I know, he will get returns that pay him well.

"The dealer in the small town and the small dealer in the large city, however, want something that is effective and yet not costly. It does seem a shame to spend \$5000 for decorations that will be no good after a certain day, but if they make \$10,000 for the man—what matters?

"Personally, I don't believe there is a better way of attracting the Christmas buying eye of the public than by the good old Christmas tree, all lit up with decorations and electric bulbs, right plumb in the center of the window, the background can either be a cozy fireplace with stockings hanging about and a log smouldering or it can be an exterior snow scene, with artificial snow surrounding the tree. The car the dealer is selling should be a part of the background, not, as some suggest, the backbone. But perhaps backgrounds would



Here is an attractive window which, according to Miller, might be reproduced less expensively by the elimination of the fireplace and the substitution of a background of gay Christmas colors

be a little too costly in some cases—then I would get the tree, have it well decorated and attractively lighted and buy some red crepe paper, making a solid background of this, with, perhaps an occasional dash of green and using the artificial snow to cover up the bareness of the floors.

"A black car would look good in such a window, but, if a green one was handy, I think I should put it in, but not a red one. The lights on such a window? Red and green, of course, with, I think, the red a trifle stronger than the green.

"Have you seen these pale blue-grey canvases, that resemble pastel work? You know, the kind that look like the winter twilight? They make an effective background. A good substitute for these might be had in a pale blue crepe paper

with the snow and tree and silver paper stars pasted onto the paper. Dark blue lights for night and then, from a corner, a spotlight with the outline of a star to play on the automobile displayed.

"A thing that I might mention here is something that has been, to my notice, a common error with automobile dealers and that is the use of flowers at Christmas time. Cut out all reference to flowers—no roses, palms, nothing that is not seasonal. There is the Christmas flower, a beautiful frail white thing which is sometimes used at Yuletide, but it is not necessary.

"In decorating the interior of the salesroom, I believe I would use holly, evergreen and mistletoe. There is the red Christmas flower from California which is pretty generally used, it has five red



These two photographs are reproduced here to show how H. M. Conrow, Dodge dealer at Hampton, Ia., decorated his own window at Hallwe'en. You can probably do a lot of Christmas "fixing up" yourself at small cost

petals with a golden center and can be effectively introduced here and there to relieve the other decorations.

"Every one knows that red and green are Christmas colors, but that doesn't mean that gold and white and blue cannot also be used. I would recommend the use of softer lights in the salesroom and I would advise against the over use of decorations. Simplicity should be the key to every effort and your own judgment is the only thing which can dictate how far you can go."

"I would not put in a fine window if the rest of the place was not in keeping with it. You know what an effect a fine house with a well kept lawn and pretty flowers has on the passer-by? Well, that is the same as a fine window. To go into that house and find its rooms untidy or bare would repel. It is the

same with the window when the show room is not a 'follow-up' on it."

In further commenting upon Christmas decorations, Miller said that he had had some orders from dealers to prepare something new for them in the way of cards and advertisements. He said that in preparing the cards and ads, he would recommend that dealers remember that the Christmas spirit is all that is necessary.

He told of a clothing merchant who used a giant picture of the first Christmas as a background for his window and then placed his display in front of it. He said that in this there might be a suggestion for the automobile. The picture in the case of the dealer might be simply a winter scene or the cozy interior of a home with the car sitting near the tree and with accessories placed all around the floor.

One window that he designed for a tire dealer last year employed three tires one large and two smaller ones. These were used as frames for beautiful winter scenes and the foreground was dressed with artificial snow and three spotlights which played on the pictures at night. The background was of black velvet, the snow and the white lights making a vivid foreground and outlining the tires in a very attractive manner.

Lighting, according to Miller, is a very important part of all displays and he is in favor of soft lights in all Christmas work as they suggest something different from the ordinary cold glare.

In the use of other than green and red colors, Miller told of the importance of blending such colors to attract and the cars to be used in order to avoid getting "wild" or unseasonal combinations.

New Williams Cylinder Grinder is Vertically Mounted

RECENTLY there has been placed on the market a cylinder grinding machine of the permanent type, known as the Williams. From the accompanying illustration it is evident that this machine is a departure from conventional practice in that the grinding head is vertically mounted. The entire planetary mechanism of the spindle and wheel head is carried on this movable carriage. The abrasive dust from grinding is directed downward, but the vertical column ways are protected from the effects of this dust by a canvas curtain, which is extendable and which covers the lower part of the ways automatically when the grinding head is moved up or down.

Due to the method of construction, the manufacturers claim that less power is required for operation of this machine than the conventional type of horizontal grinder. Transmission losses, usually encountered in a grinder, are said to be greatly decreased by the method of drive used.

The motor shaft drives from both ends, one end has a belt drive direct to the wheel spindle, the other is a gear drive to the planetary mechanism of the grinding head assembly.

The lower end of the motor shaft carries a spur pinion, which drives through a train of spiral, bevel and spur gears to a pinion that meshes with a bevel gear on the grinding spindle unit.

The spindle is mounted in a sleeve which in turn is eccentrically located within a second sleeve member, which carries the bevel gear previously mentioned. A graduated dial indicates the amount of eccentricity of the grinding wheel spindle in relation to the spindle unit. The range of adjustment is $1\frac{1}{8}$ in., which, in connection with the proper diameter grinding wheels, enables the

grinding of all commercial sizes of cylinders.

A hand operated clutch provides speeds of 40 or 60 r.p.m. of the planetary movement of the spindle unit. The rate of feed of the wheel through the cylinder can be adjusted to any one of sixteen speeds, ranging from .007 to .375 in. per minute.

Provision for feeding the spindle unit assembly up and down on the column of the machine is accomplished by means of pinions meshing with the racks. Power is taken from the horizontal shaft

through a worm to a worm wheel fitted to the cross shaft, on which are mounted the pinions which mesh with the column. A capstan wheel is fastened to this cross shaft to provide for raising and lowering the spindle unit assembly by hand. The capstan wheel is furnished with a clutch, which locks the worm wheel to the cross shaft, and when this clutch is released it provides a power movement of the spindle unit up or down, as desired.

General specifications of the machine are as follows:

WHEEL SPINDLE—Regularly furnished, grinds holes $2\frac{1}{4}$ in. and larger; speed, 5000 and 7000 r.p.m.

ARBOR—Diameter, $2\frac{1}{8}$ in.; length, 15 in. with grinding stone 17 in.; speed, 40 and 60 r.p.m.

UNIVERSAL TABLE—In and out 7 in.; cross travel for centering work; 28 in. finished top of table, 38 in. long, 18 in. wide.

SEAT JIG—For holding cylinder blocks where heads are cast integral.

MOTOR POWER—1 2-hp. electric motor, mounted and drives direct on rear of transmission, travels with head; speed of main driving pulley 1800 r.p.m.; diameter of main driving pulley, $7\frac{1}{2}$ in.; width of driving belt, $2\frac{1}{2}$ in.

GRINDING WHEELS—Diameter, $2\frac{1}{4}$ to 5 in.

FEED OF HEAD—Range, $1\frac{1}{2}$ in. and 10 in. per minute.

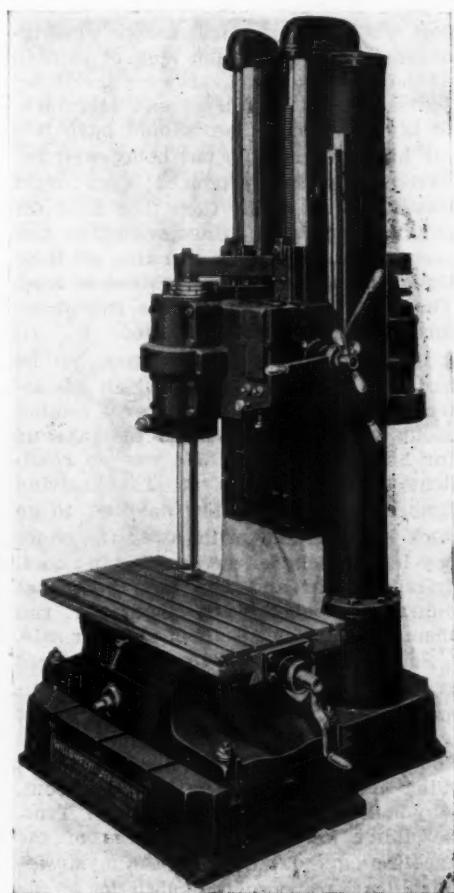
FLOOR SPACE—Extreme width, 37 in.; length, 42 in.; extreme height, 7 ft. 0 in.

VERTICAL TRAVEL OF HEAD—28 in.

TOTAL WEIGHT—Including universal table and motor, 4000 lbs.

EQUIPMENT—1 truing diamond with holder, assortment grinding wheels, driving belt for eccentric, crank, wrenches, motor starter or switch.

This machine and equipment is being marketed by the Hi-Way Service Co., South Bend, Ind.



The Fable of the Dumb-Bell Who Was Always Chasing the Pot of Gold at the End of the Rainbow and Who Lost Out

By TOM WILDER
With Apologies to George Ade

ONCE there was a Boob who had fallen flat in everything he had ever tried, so he decided that he could coin a lot of Jack running a garage. He was a very cheerful Goof, but somehow he always Put his Money on the Wrong Horse. He would Sail into a venture with all the Crust and assurance of a hardened tradesman and a promoter put together.

He always placed all his Chips on One spin of the Arrow, and if he lost, which he generally did, the game was N. G. and he prepared to Play another.

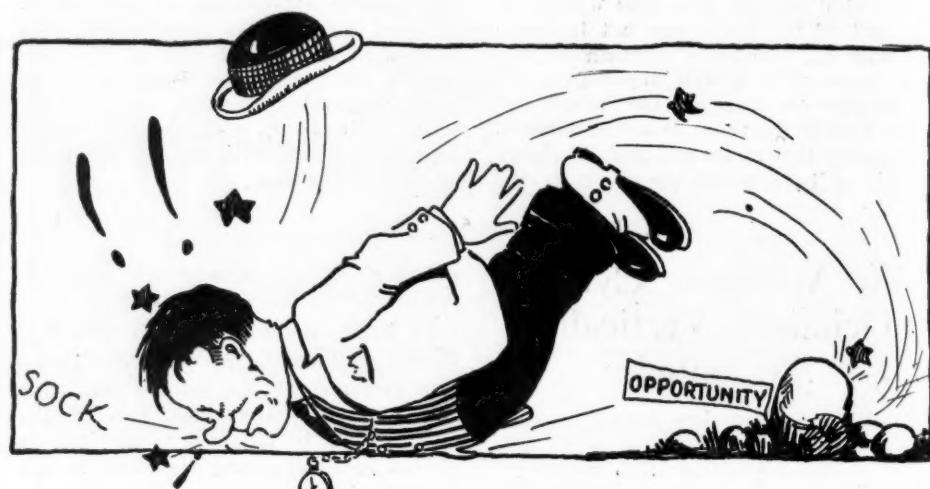
He never tried to Frame a System based on experience; His eye was set so hard on the Shiners that he didn't get any experience.

In this nonchalant and optimistic way he had tried his hand at Farming and had gone in strong for potatoes because he had reasons to believe prices would be high that year. They were, but while He was away on a little fishing trip the bugs Put One Over on him, so that all he had to sell was a few marbles that hardly paid for the digging.

The next season he decided that Stock was the thing and that he would start with hogs and sheep which, being fast breeders, would soon make him wealthy. He was a little late getting started, however, and in the spring rush entirely overlooked the provision of fodder for his forthcoming flocks until it was too late to plant. He could buy fodder, though, and Kidded himself into believing that it was cheaper in the long run.

His potato fields afforded poor grazing for his lambs, so that through poor nourishment they contracted a disease and he lost a good share of the young ones. His hogs fared better, but corn was high that year and Hogs brought less than the cost of fodder, so that, as a whole, the venture was all to the sheriff and he found himself selling out to pay his rent, with less than nothing left.

His next entry was in the role of Lumberman, and he was highly expectant, for he knew well that great fortunes had been amassed in that industry. While he knew nothing of the business, he had an opportunity to buy a sawmill for a song and on easy terms, as the owner had died and there was none in his family that cared to continue. He knew all he had to do was run the logs through and sell the product at a Fancy Profit, as lumber prices were away up. But the mill was small, equipment inferior and run down; good logs ex-



"He fell flat in everything he tried"

pensive and hard to get; good labor high and unobtainable and so that with an inferior product and no capital, he soon found his fat goose stuffed with sawdust.

After a couple more ventures of this sort where his principal assets were ignorance of the line and lack of capital, he decided that chickens were the thing, so he got a lot of hens and told them to lay for him. They should have laid for him with a club, but being well behaved hens they produced eggs right merrily for a while, then they Laid Off and he discovered after production had ceased that they were spending all their time picking themselves instead of food. The heavy laying season was passed before the trouble was corrected.

Eggs were high that summer, but he had few to sell so he turned all his attention to his chicks, which were coming along nicely and promised to make up for his loss in eggs. He was so confident of Cleaning Up at Thanksgiving time that he took a few days off to go duck hunting, and while away the chore boy left the chicks out all night in a cold, drizzling rain and most of them that didn't die contracted a cough that ran them down and made them unfit for sale.

So the easy roads to success were gradually becoming exhausted; few remained that promised wealth without work. As stated in the beginning, the Poor Boob had tried his hand at everything else that he knew nothing about, why balk at garage or motor cars? True, he didn't know the intricacies of the gasoline engine, much less the mysteries of the carburetor or the subtleties of the

electric system. But a few minor details like those never worry a real optimist, so he began to cast about for a location.

Empty buildings suitable for garage use were scarce and his reputation as a ne'er-do-well was beginning to handicap him so that after he did find places the owners refused to lease them to him because the prospects of collecting the rent seemed too slim. He had the largest collection of bankruptcies and unpaid debts of anyone in that vicinity.

The Big Idea had been to open a storage garage, that, he figured, would be Easy Money; 100 cars at \$8.00 a month would be \$800.00 almost clear profit. He could hire a boy to watch the place and could spend much of his own time enjoying himself and otherwise being a Hot Dog among the Boys.

Now, it requires a building at least 50 by 325 ft. to house a storage business of 100 cars, but our Hero didn't know that, and had his mind's eye set on an old livery stable, or some such place; almost anything so long as it had a big door and a place in front for an office. The office must be in front, of course, so that the chief could see what was going on while the boy did the work.

After using his fine-toothed comb on the country and surrounding towns, he at last located a frame shack originally built for a boiler shop but used in several other capacities later, as boiler buildings didn't seem to pay in a farming community.

This happened to be pretty well located but it would have been just as acceptable had it been otherwise, because

he didn't stop to think that the number of cars passing on a highway in a day determines to a great extent the desirability of a location.

All he thought was of that storage business and he craved a place in which to corral the busses and collect the coin. He knew his place wouldn't hold a hundred cars, but he thought that it would hold enough to bring him a fair living and later he could build an addition.

As a matter of fact, the building was



"He bought a sawmill for a song"

35 by 60 ft. with a door at the end; about as undesirable a shape as one could conceive of for a storage business. It would hold nine cars in one row lengthwise, with just enough room left for an aisle; or it would hold five cars crosswise, so that by packing them two deep at the end opposite the door he could take care of 10 there and three at the other end with a narrow aisle.

He didn't stop to plan that out because he couldn't have if he had tried, but nine cars, or possibly 13, at 50 cents a night wouldn't make a spendthrift of anyone, even if all his space were filled every night by transients, which would be out of all reason; his gross receipts could not be over \$195 per month. If he struck an average of \$100 a month he would be making good on his possibilities.

But let us see how things worked out. The first patron who happened along the turnpike after our Hero had hung out his Muslin sign and opened his big door was a man with a punctured tire. Our Hero had never fixed a puncture in his life and was forced to acknowledge that he had neither the tools nor the ability, whereupon the patron Bawled Him Out gently but firmly and went on his way on his shaky spare.

The next customer to approach our storage emporium yelled loudly for gas and oil but without effect, for the keeper of the Dump had never thought of the advisability of supplying his customers with these things; the profit wasn't much and it would be a lot of work, so why go to the expense of handling them.

All day long people stopped, attracted by the bright Muslin Come-On, but it didn't mean anything. Whenever they asked for anything they found they were talking to a Dumb-Bell.

After a week of this sort of thing, and with the fees of only a few storage cus-

tomers in the till, he came to the conclusion that someone had Doped it Out All Wrong. That the garage business was not a gold mine and that it consisted mostly of taking abuse, working hard and getting smeared with grease, all of which were anything but Apple Sauce to him and not appreciated even with due compensation.

Now, there was in this town a young Motor Fan named Curtis—Curt for short—who's apparent greatest desire was to hear an engine run. Whenever he heard the pop of any exhaust he would set spurs to his Legs and come up at a Gallop. He had already rebuilt old tumbled down chassis into a racing job that would do better than 70 when the town marshal had gone fishing. This tickled Curtis's Uncle, who was well fixed and helped Curt and his Widowed Mother a good deal. He was sure the boy was going to grow into a mechanical expert of some sort.

Curtis had been almost constantly in attendance at the new garage, hoping for a thrill. While he didn't say much, it made him sick to see good profitable business turned away. He could also see without half trying that this bird wouldn't last the month out, and wondered what his Big Idea was. He also saw from the numerous calls for service that the location was an admirable one for a repair shop with accessory store in conjunction.

He was tempted to try to make a deal with the Prop. whereby he could run a repair shop in connection with the new Garage, but decided there was a better way—at least for him. He talked the thing over with his Uncle and his Uncle agreed to help him out as to financial backing and influence. He found out that the Guy had paid a month's rent but another was nearly due and the owner wasn't a man to stand for a tenant who couldn't pay, so it came to pass before many weeks that Our Hero disappeared from Brunsville as mysteriously as he

took advantage of his leisure to study electric systems and the various processes of repair that were new and approved. He subscribed for the best trade papers and went after his subject in earnest.

He induced his Uncle to buy a lot that adjoined the shop so that when the time was right he could build a structure that would be more to his liking and make it possible to serve his customers better.

Unlike his predecessor, every way he turned and everything he did turned to his advantage because he knew his subject, believed in it, and had a definite purpose. Also, that purpose was not simply to take the money away from the



"Easy money sometimes grows on trees, but the tree will be found to be planted in gray matter and watered with sweat"

customer but to give the customer something that he was willing and glad to pay for.

Moral—Easy money sometimes grows on trees but the tree will be found to be planted in gray matter and watered with sweat.



"Whenever they asked for anything they found they were talking to a dumb-bell"

had come, and in a very short time the big door was re-opened by Curtis, who posed not as a liveryman but as a service man who would exert every effort to keep his customers on the road.

He was handicapped at first by scanty equipment and supplies, but soon added the necessities and was busy as he could be till snow fell. By this time Curt had found out his short-comings and now

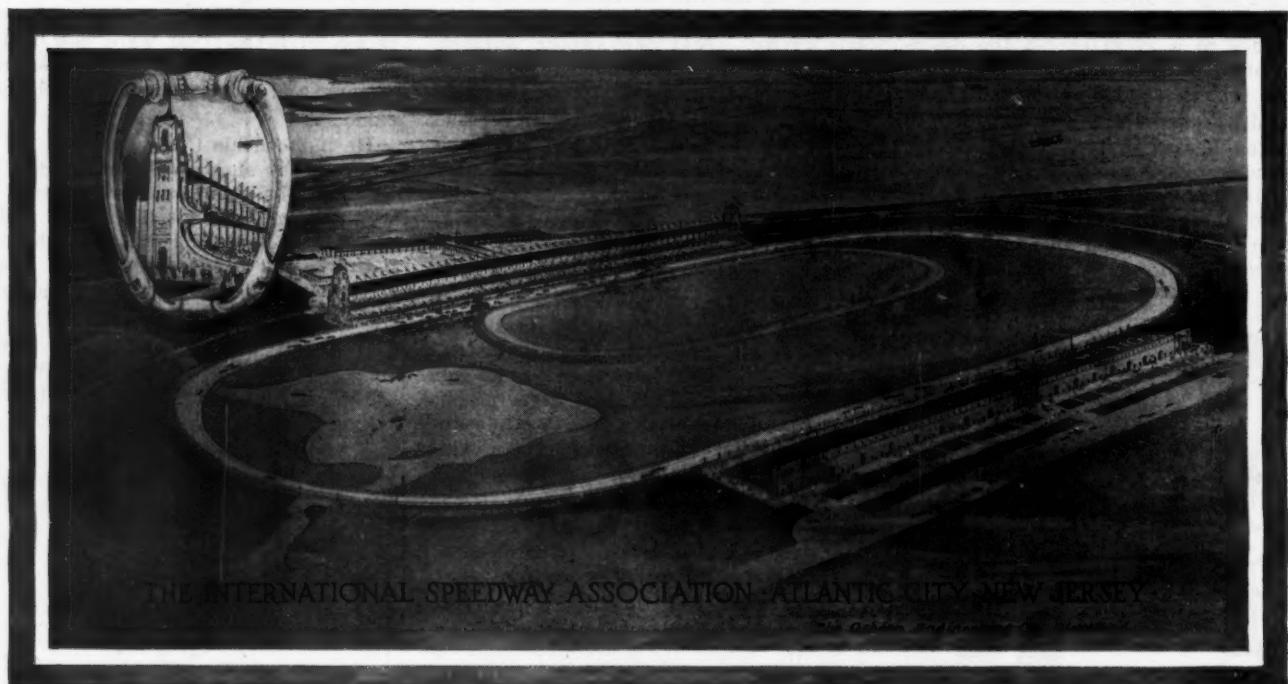
Who's Your Used Car Salesman?

So many men, so many ways there are for trying to cope with the used car situation. The Snow Automobile Co., Ottumwa, Ia., uses the foreman of its repair shop as a used car salesman very effectively.

All trade-ins are inspected by him as a matter of course before appraisement is made, hence he has first hand and accurate knowledge of the actual condition of every used car on the floor. Also, whether the used car is sold "as-is" or whether any reconditioning is done, he knows all about it. Thus he is in a better position than is anyone else about the place to represent the car to the prospective customer just as it is.

Also, permitting him to function as a used car salesman relieves in part the new car salesmen from the obligation to put their time in on trying to dispose of the trade-ins. In this particular case this plan seems to work very well, according to Norlan Snow, president of the company.

MOTOR AGE'S PICTURE PAGES



This is the architect's visualization of a proposed speedway to give Atlantic City's summer resorters the thrills of automobile racing. The promoters hope to have construction under way in a few months.



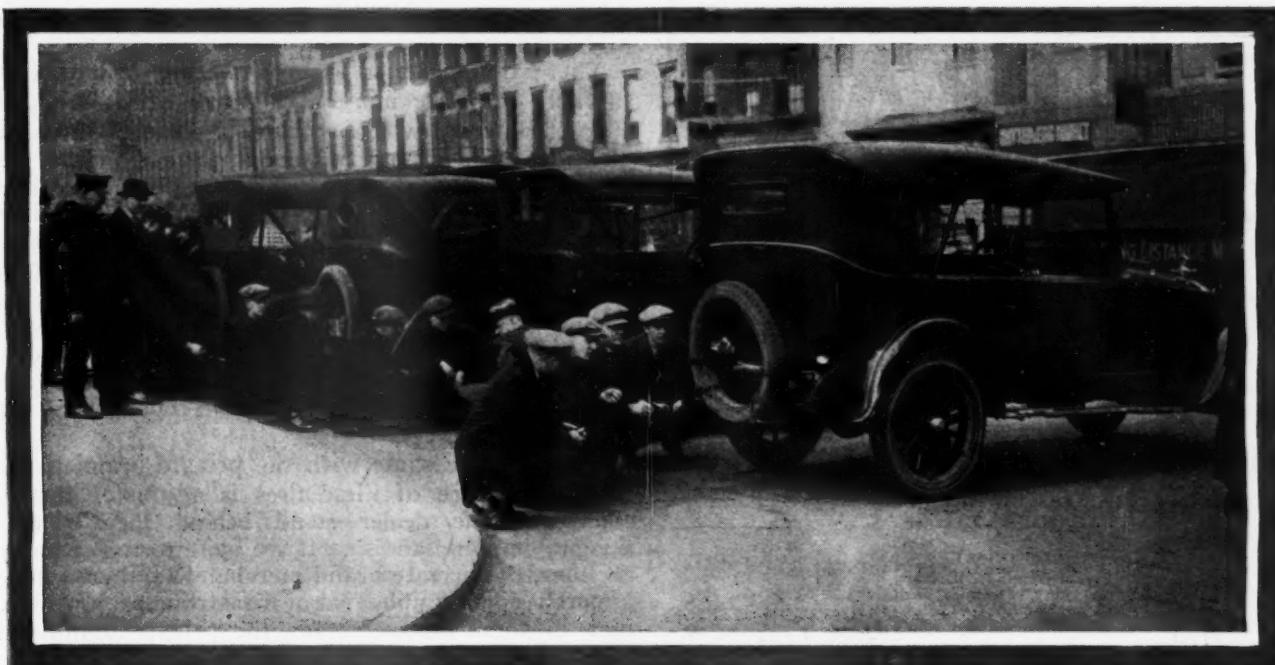
Jackie Coogan, youthful "movie" star and his mount go to it with dad for a skirt around the studio lot. While Jackie's father may be long on car, he is short on speed, so the press agent says.

Right: A motor magnate and his blacksmith chum—J. Dallas Dort, president of the Dort Motor Co., and Art Bickford, who has worked for Dort for 32 years. Bickford had never been on a vacation longer than a fishing trip when Dort recently invited him to run down with him to see the big towns along the coast which meant a tour of Boston, New York and Philadelphia.



The Third Annual Distributors' Convention of the Gabriel Mfg. Co., makers of Gabriel Snubbers was held Oct. 2 and 3 in Cleveland. Expansion under way to accom-

OF AUTOMOTIVE INTEREST



A flock of New York police "rookies" training for the automobile squad. One of the greatest sources of worry for the New York police body is the problem of stolen automobiles. Sgt. Brennan is training them for quick work which they very often are called upon to do



The famous sketch of a dog in the London Daily Sketch has been reproduced as a mascot and radiator decoration for cars. This figure, known, the length and breadth of England has caught the eye of the motoring public

THE MODEL A MOON
The Car You Will Eventually Buy

Grant Square Automobile Co.
1378 Bedford Ave., Brooklyn, N. Y.
New York and Greater New York Distributors

Boston Mechanical Co.
20 Park Square, Motor Mart, Boston, Mass.
New England Distributors

Central Automobile Co.
5080 Center Ave., Pittsburgh, Pa.
Western Pennsylvania Distributors

For particulars write
MOON MOTOR CAR CO., St. Louis, Mo.
Members American Motor Car Manufacturers' Association, Chicago.

An antique from the back numbers of *MOTOR AGE*—this Moon ad proclaimed to the world the wonderful improvement in automobiles—compare it with that company's or any other company's ads of today and you will have reason to gasp at the vast space that has been bridged since this ad appeared in 1906



Over 100 distributors and agents were in attendance. The company plans a production of 8,000 snubbers a day for 1923 and has building modulate the increased volume

MOTOR AGE

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Private Brand Tires

IN inquiring into the conditions of the tire merchandising, you always find prominent the subject of private brand tires and somehow the person who brings up the subject is usually under the impression that this is a new "problem"; generally he views it as an "evil." It is not new and is a lesser evil today than it was a few years ago.

If the tire dealer has at hand back copies of the Tire Rate Book, and he will refer to some of the more or less ancient copies, he will see that this publication has for a number of years made a distinction in its treatment of the factory branded and the private brand tires. This distinction is broad enough in the publication that he who runs may read, and there is never any danger of a reader of the Tire Rate Book becoming confused on this issue.

As a matter of fact, the private brand tire is just the same sort of a problem as any other business situation. There is no fundamental reason why a private brand tire should be good or bad, except as its promoter has ideas about his merchandise. Some very good tires, with a long and creditable reputation, are private brands, the men back of them have high ideals of merchandising, and they have them made only in factories that can and will turn out good work. The production

is superintended by a representative of the owner of the brand and they go through the years with the same high standard.

There is the other sort of private brands (unfortunately they are more numerous) which are pushed onto the market with a view of a cleanup and a quick getaway. It is a fact that some of the best private brands are generally supposed to be legitimate factory brands, for it is the tendency of the American public to inquire into a case only when there is a hint at scandal. The average American family lives above suspicion until there is a hint that the marriage ceremony was somewhat lax, and instantly everybody from the chief news editor of the most enterprising newspaper of the town down to the bar-room gossips are interested in the social problem that is raised by the reports that spread abroad.

It is just the same with the private brand tires. If the performance of these tires is adequate, the home office and the dealer stand behind them, they are acceptable merchandise. If we were to reject today, in all lines, the private brand merchandise, there would be a merchandising upheaval of disastrous proportions. In fact, in some lines of trade the private brand line is more prominent than in the tire trade.

The only suggestion needed when private brand tires are subject of a dealer proposition is to examine very carefully into the business antecedents of the owner of the brand.



If you forget to charge a 50-cent spark plug, you've got to get \$5 worth of new work to pay for the loss.—SHERMAN.

**Advance of Maintenance Education**

THE question of business associations and their usefulness became a part of the discussion at the Automobile Mechanical Education Conference at Detroit last Wednesday, and while this point was not up for formal discussion, by inference a good many things were said. One point very plainly made, but without a direct statement to that effect, was that business is in danger of being over association.

It was the first impulse of this conference to establish an organization to promote the educational interest with other branches of the industry. The first step away from this idea was that the organization be entirely informal and that a committee be named to make the necessary contact. It was recognized that the membership of such a committee would be burdensome and it might be without authority or responsibility.

Then came the happy thought from the committee on resolutions that the Federal Board of Vocational Education could act, and being a working and responsible body could supply any necessary machinery and carry on without detailed instructions. The Federal Board accepted this trust and will report back at similar conferences which will be called in convention with the regular educational conferences. In view of this result of conference MOTOR AGE is exceedingly gratified that it was through the initiative of this publication that the conference came to be.

The next interesting point was the consideration of the various organizations with which contact should be formed, and this brought out in private conversation expressions of surprise at the seeming overlapping of some of the existing institutions. Also many of the educators had always taken the name of the National Automobile Cham-

ber of Commerce at its literal meaning and had inferred that, once contact was established with this body, it was a contact with the industry in its various phases, not merely an association of manufacturers of complete vehicles.

There may be a suggestion in the thoughts of the educators that could benefit the industry—a simplification of its business associations.



Don't overstock. If you pay \$12 a dozen for an article on which the profit is one-third and sell but eight, your profit is on your shelves.—SHERMAN.



National Show Dates

AT a recent National Automobile Chamber of Commerce dinner there was a celebration of the majority birthday of the anniversary of the industry. Great things were predicted for this young giant that had attained such robustness in his juvenile years. All of this was as it should be.

Then!

The leaders of the industry went home and kept on doing things in manhood just as they had in boyhood. They did not follow the famous writer of the Tinkling Cymbal chapter who says, "When I was a child, I spake as a child, I thought as a child; but when I became a man I put away childish things."

Precedent of the younger days has held hard and fast with the industry, and on no point has it held more closely than on the question of dates of shows. Recently there has been much talk from the best salesmen in the industry that automotive selling had become an all-year business. It is a fact that the time of year for bringing out new models has recognized this movement by changing gradually from January to September or the beginning of the fall season.

This is only natural. The salesman on the firing line needs the best ammunition for his hardest battle, which is the fall and winter months. Also the present day sales development is in the closed car. A manufacturer who would save his closed car announcement for the January show would be regarded by his associates in the industry as somewhat lightheaded, yet the industry, acting as a whole, has done this very thing.

Under the present trend, the shows are going to come in January with practically nothing that is new or interesting for the public to see. MOTOR AGE has recently listed the new models announced this fall against the possibilities of the show. This list does not compare well. It appears that the crowds are expected to come to the shows this year to see "old stuff," if a model of a few weeks can be called "old," and it would seem that they can be so considered when the thoroughness of the automotive dealer display is considered.

It is the opinion of MOTOR AGE that the dealers in hundreds of cities, in giving their fall shows, are a step in advance of the master minds of the N. A. C. A. and, if the manufacturers do not look sharp, that the dealer shows in New York and Chicago will soon be better shows than the national exhibitions. The dealer has taken this step because he saw the necessity of arousing public interest, while the manufacturers were following the precedents of youth.

The fall shows, introduced as the winter shows now, by two great national exhibitions, would arouse double

the interest as in the past. We predict that for many years to come the early fall will be the period of new models and that the fall and winter will be regarded as the beginning of the new sales season rather than the tag end of the old one. Such a movement will smooth out the selling curve and put the dealer into an all-year business.

Another point worth considering is the value of Christmas as a date for putting the name on the dotted line. If this industry would urge the automobile as the family Christmas gift it would gain a strong psychological closing argument and the fall season effort could well lead up to this, and then the dealer would have a few weeks to clear up his ragged end sales and get an earlier start for the spring business. Heretofore he has waited for the show season before thinking much about the new season.

What do you, as dealers, think of this?



This industry hasn't made any more mistakes during the past 25 years than any other young man of the same age.—SHERMAN.



Vaudeville and the Electric Shop

IN the days when concoctions for healing the ills of mankind were freely sold on the street corners, there was a trick in vogue for getting the attention of the crowd. Two pedestrians would bump against each other, start an argument, and get into a fight, and when sufficient crowd had gathered, the fight would stop and the combatants, mounting soap boxes, would begin to sell their wares.

The same type of psychology is used by a certain electrical station in selling its customers on the fact that it does business on the square. Those who are engaged in the maintenance of the electrical equipment on the car are aware of the fact that the customer does not know much about the starter, generator or battery. Consequently he often objects to the amount of the bill because he can not appreciate the extent of the work involved. In other cases he may have a legitimate claim for adjustment of a bill, perhaps due to a part that has been used in a repair job, showing a defect in a short space of time.

When such a customer comes in for adjustment, and the shop manager decides that he will grant the justice of the claim and make good on the job he does so in such a way that he gets back by advertising all that he may lose in labor and material. This is done by getting the customer over near the counter where customers are lined up buying parts.

The discussion with the complaining customer is begun and just enough mild objections used to start an argument. This is never carried to the point where the customer flies off the handle, but just far enough so that those within ear shot are straining every nerve to get both sides of the story. Then the shop manager says, "Mr. Driver, I believe you are right, run your car in, and we will fix up the generator and it won't cost you a cent."

Everybody heaves a sigh of relief, decides that the concern is on the square, and the loss in labor and material in making good on the job has been made up by the good will obtained.

11 Governors for 2-Cent Gas Tax

Executives of Western States Agree on Plan to Raise Funds

Uniform Laws Covering Automobile Thefts Also Will Be Urged at Coming Legislatures

SAN FRANCISCO, Cal., Dec. 2—A tax of two cents a gallon will be placed on gasoline next year in 11 western states, if the governors of those states are able to press such a law through their respective state legislatures. This agreement between the executives of California, Arizona, Nevada, Colorado, Idaho, Montana, New Mexico, Washington, Utah, Oregon and Wyoming, was reached at a conference held in this city Nov. 25, attended by Governors Louis Hart, of Washington; Emmet D. Boyle, of Nevada, and William D. Stephens of California, and the secretaries of the other eight governors, the executives themselves being in attendance at the Colorado River conference at Santa Fe, N. M., and unable to leave. Funds from this tax are to be applied to building and maintenance of roads.

Uniform Law Enforcement

The governors and their representatives also decided to present to their respective legislatures, as soon as it could be drawn, a uniform law for the pursuit, arrest, identification and punishment of automobile thieves seeking to escape by fleeing from state to state, or driving stolen cars from state to state in an effort to sell them. The gasoline tax law will be copied after the one now in force in Washington, Oregon and Arizona, but all the governors will cooperate on an auto-theft law under which pictures and identification tags of known thieves and of suspects will be broadcast to the police of all these states immediately on the theft of a car, with full information concerning the car, and, if possible, a photograph of it.

Under this head also, comes a plan for a state automobile constabulary, mounted on motorcycles, for the patrol of the highways and the immediate pursuit of automobile thieves. Insofar as possible, state lines will be eliminated in the work of these mounted police, by making them members of the force of each state in the agreement. More equitable automotive taxation, and uniform traffic rules for all the states also are to be considered by the legislatures of each of the eleven states at their coming sessions. The present plan is to have a later conference between members of the legislatures of these states, to draft uniform laws and to arrive at an agreement on more equitable taxation.

The meeting of the governors was brought about by the state automobile trade associations of Oregon, Wash-

ton and California. The program laid before the conference was drawn up by representatives of these associations, who met in the Palace Hotel here the day before the conference, at the call of L. E. Titus, president of the Washington Automotive Trade Association, and Robert W. Martland, secretary-manager of the California Automobile Trade Association. The governors uniformly favored the plans presented. Automobile trade association men who drew up the program, besides Titus and Martland, were L. W. Harkins, chairman of the executive board of the Washington Automotive Trade Association, and William A. Simonds, secretary of the same body; James H. Cassell, manager of the Oregon Automotive Trade Association; and Walter Fawcett, chairman of the Legislative Committee of the California Association.

The outstanding result of the conference is a uniform movement among all eleven of the western states for uniform tax on automotive vehicles; uniform traffic and automobile theft laws, and a tax on gasoline which shall be the same in all the states. As Governor Hart, of Washington, said, "We want to abolish state lines as barriers to the automotive industry and to the comfort and enjoyment of the motorist."

Support of Highway Program to be Urged at A.A.S.H. Meet

WASHINGTON, Dec. 2—Unanimous support of the nation's highway construction program is to be urged by the constituted representatives of the automobile industry at the forthcoming convention of the American Association of State Highway Officials, who will hold their annual meeting in Kansas City, Mo., Dec. 5.

The industry will be represented at the meeting by the conference committee of the N. A. C. C., composed of O. J. Russell, president of the board of the Mack Truck Co.; Windsor T. White, president, White Motor Co.; Roy D. Chapin, chairman of the committee and president of Hudson company; Alvan Macauley, president of the Packard company, and Pyke Johnson, Washington representative of the N. A. C. C.

RANGER IS BANKRUPT

HOUSTON, Tex., Dec. 1—The Southern Motors Manufacturing Assn., Ltd., manufacturer of the Ranger automobiles, trucks and tractors, has filed a voluntary receivership suit in the state district court and E. R. Dupree has been appointed receiver. The receiver's bond was fixed at \$50,000. Jaques S. Blevins, president of the company, stated that its assets approximate \$2,000,000 and greatly exceed liabilities. He stated that negotiations have been under way to merge with "one of the larger companies."

California Business Improves Greatly Over Former Months

Sales Throughout State Grow Steadily, Says Trade Association President

OAKLAND, Cal., Dec. 2—The automobile business in California is in better condition than it has been for several months, and trade throughout the state is improving steadily, according to Robert W. Martland, secretary-manager of the California Automobile Trade Assn., who has just returned from a tour of the automotive businesses of the state in the interests of the association he directs.

"California is enjoying better business health, automotively speaking, right now than for several months," said Martland, "and everything everywhere in the automobile business in this state is on the upgrade and going strong. The Los Angeles automobile show has had a great stimulating effect on trade there, and closed car display weeks in Oakland and San Francisco helped business and made the demand more active throughout this end of the state. The demand for closed cars is one of the outstanding features of the year; more have been sold this year than ever before, and more will be sold next year than this."

Eliminating Many Men

"Progress also has been made this year in eliminating those men who have failed to find a niche in the automotive industry, and those who have failed to give good service on business principles. The 'gyp' garage man has found it virtually impossible to compete with his well-equipped, permanent and honest neighbor, and, in many cases has gone out of business, for the good of business. Those who have conserved their resources and who have played fair are still going strong and doing well."

"Fewer automobile men in California have failed this year than last, simply because the 'weak sisters' have been eliminated, and cannot get back again into this highly competitive field. All this 'house-cleaning' in the automobile business has done much to make the car owner happy. He is getting better service. The advent of the flat-rate system for repairs is becoming general throughout the industry, especially in California, and has done much good. In most reputable garages and repair shops you can tell now just how much a certain repair job is going to cost you before you order it done. Prospects are bright for the coming year, with California well in the lead."

November Production About 220,000

Murphy Wins Beverly Hills Race At 114.6 Miles An Hour

Takes 250-Mile Contest In 2 Hours, 10 Min., 53.10 Sec., in a Durant Special

LOS ANGELES, Dec. 4—Establishing a record for 250 miles, Jimmy Murphy won the race on Beverly Hills speedway yesterday, which was postponed from Thanksgiving day, by averaging 114.6 miles per hour. Earl Cooper was second and Harry Hartz was third.

Both Murphy and Cooper drove Durant Specials which were built by Harry Miller of Los Angeles. Bennett Hill finished fourth, Milton fifth and Klein sixth. Seventeen cars started.

Herschel McKee was eliminated by an accident in morning practice. He and his mechanic, Hugh Curley, are in a hospital and it is feared that Curley's injuries may be fatal. The only accident during the race occurred to Elliott when a rear wheel collapsed. Neither the driver nor the mechanic were injured. Murphy's time for the 250 miles was 2 hours, 10 minutes and 53.10 seconds.

FACTORY BRANCHES FOR LEE TIRES

LOS ANGELES, Nov. 30—Deciding to market its product on the Pacific coast under the direct jurisdiction of the parent concern, the Lee Tire & Rubber Co. has decided to open branches in the larger coast cities on Jan. 1 when the Chanslor & Lyon Co. will relinquish the franchise which it has held for 10 years. The Lee San Francisco branch will be under the management of Tom H. Wilkinson for many years manager for the United States Rubber Co.

In Seattle, the Lee branch will occupy its own building at Ninth avenue and Olive street. The Lee Seattle branch will be under the management of C. C. Miller, formerly manager of the Good-year branches in Seattle, Spokane and Butte. In Portland, a Lee branch will be opened at Broadway and Flanders street under the management of D. L. MacPhee who has resigned as credit manager of the Portland branch of the United States Rubber Co. to accept the position. In Spokane, the Lee interests will be represented by G. B. Kemp and R. S. McClintock of the Inland Battery Co., 1215 Riverside Avenue, west. In Butte, Mont., P. E. Crawley, proprietor of the Broadway Garage, will assume the distribution of Lee tires in eight counties. A strong Los Angeles connection is being established by the Lee company which will complete the extensive reorganization of their Pacific Coast affairs.

LAMP ADJUSTMENT SOUGHT

BOSTON, Nov. 30—As a result of a petition signed by a number of motor

car dealers along Boston's motor row, and several motorists, there is to be a hearing before the governor's council at the state house here on Dec. 6 in opposition to the proposed new rear light law. Since the announcement of the regulation a week ago, and the approval of some of the lamps, a number of dealers got word from their factories that they would not get cars with new lamps to meet the Massachusetts specifications. So far only six motor companies have had lamps approved.

Couzens Goes to Senate; Is Old Automobile Official

DETROIT, Dec. 2—The naming of James Couzens, mayor of Detroit, as United States Senator from Michigan to succeed Truman H. Newberry, places in the senate one of the foremost automobile men of the country, and as such, the appointment is regarded very favorably by the industry.

Couzens became identified with Henry Ford in the early days of the Ford Motor Co. and became executive vice-president, a position he held for many years before selling out his interest to Ford at the time the latter bought up all holdings in his company. His original investment in the company brought him about \$29,000,000 when he sold out.

Since leaving Ford Motor Co., Couzens was elected mayor of Detroit and has devoted practically all of his time to the duties of that office. He has been active in the advancement of the principle of municipal ownership for public utilities, the street car lines having recently been taken over by the city. Under his direction these have made money from the start despite five cent fare.

SPRINGFIELD (O.), DEALERS ELECT

SPRINGFIELD, O., Nov. 30—Fred W. Moyer was elected president of The Automobile Dealers' Association at its annual meeting. The other officers chosen are: Vice-president, W. E. Stevens; secretary, D. C. Smith; treasurer, W. F. Townsley; new directors, Charles S. Burke and George W. Higgins. It is planned to hold an automobile show at Memorial hall in February. General business among the dealers is good.

WARNED AGAINST ACCIDENT

PITTSBURGH, Nov. 30—Members of the Pennsylvania Automotive Association were warned by Benjamin G. Eynon, state registrar, that "while the effect of accidents on sales is negligible now, that time will come when the accumulative force of abuse will deal a crashing blow to the industry." He said the time will come when the average citizen will demand legislation forbidding the building of engines above a certain speed and restricting fast traveling.

December Likely to Bring Year's Total to 2,500,000

Factory Schedules Well Maintained As Country Continues to Absorb New Cars

NEW YORK, Dec. 4—With production of cars and trucks estimated at 220,000, November not only establishes a record for that month but becomes the ninth consecutive month to pass the 200,000 mark. This figure was reached in the face of a short working month, inclusive of a holiday, which was the only factor keeping the total output from equalling that of October.

As it is, the high mark in the production history of the industry for a year's output has been passed by a substantial margin and the end of December will probably see the total production for the twelve months around 2,500,000. There will be some curtailment of operations this month, due to the closing of many of the plants for the regular inventory taking. But even with this done the output will have to be only slightly in excess of 150,000 to bring the year's total to that figure.

High Level Maintained

Manufacturing is being maintained at a remarkably high level, despite the season of the year when there is a seasonal lull both at plants and in the sales field, and few producers are reporting any tapering off of schedules. They are being governed in their operation solely by the demand and as yet there is no wide evidence of a sales decline.

While enclosed cars continue foremost in the manufacturing programs, there is evidence of an expansion in open car production, which will grow steadily to meet the anticipated demand in the spring. Body plants are working full blast to catch up with back orders as well as to meet those current. So great is the press for closed bodies that factories producing them will work at maximum capacity throughout the winter. Greater relief will come with the opening of additional plants after the first of the year, but probably not before spring.

CLEVELAND TRUCK SHOW

CLEVELAND, Nov. 30—Trucks, tractors, motor busses, trailers and every sort of commercial vehicle will be included in a special exhibition which is to be held in Cleveland in conjunction with that city's 22nd annual automobile show, Jan. 20 to 27. This show will be held in Central armory, a building with approximately 25,000 sq. ft. available for exhibition purposes on its one floor and which is directly across the street from the big new municipal auditorium which will house the automobile show proper.

Tire Manufacturers Frankly Admit That Prices Will Rise

Thirty Days Will Witness Increase, Is Forecast; Competitors' Action Awaited

AKRON, O., Dec. 4—Practically every tire manufacturer in the Akron district is frank to admit that tire price increases are entirely logical and almost certain to come within the next 30 days, but none apparently is ready to initiate the movement, each manufacturer waiting for the lead to come from his competitor.

In other words, Akron tire builders are pursuing more or less of a watchful waiting policy, primed and ready to boost prices as soon as the movement is inaugurated elsewhere.

The ten per cent tire price increase announced by the Kelly-Springfield company was not close enough at home to cause Akron manufacturers to tumble into line. It will take an announcement by one of the major companies here to start the upward revision of prices, and when that initial announcement comes, a grand rush may be expected.

A survey of Akron manufacturers shows that practically all of them hold the opinion that prices should be raised. They cite the fact that the price of crude rubber has increased more than ten cents a pound in the last 30 days because of the Dutch-English agreement to curtail production following the passage of the British Stevenson law whereby an export tax is laid on all crude rubber exported, with graduation upward as the amount of crude rubber produced increases.

Cotton Fabric Increase

At the same time the increase in the price of cotton fabric for tires is cited as making a tire price increase logical. And in addition to these there has been a gradual increase in the cost of labor, all three factors having cut the tire manufacturer's margin of profit to a minimum.

November was the low-ebb month for tire output, manufacturers starting on increased production the first of December. Production will be built up in order to replenish finished goods inventories so as to have an ample reserve stock of tires available for spring business. Manufacturers, basing predictions upon spring orders already booked, say the tire business from the first of the year on should be the heaviest in the history of the automotive industry.

Dealers throughout the country are displaying more optimism and are less conservative in ordering supplies of tires and tubes. Last spring, overly cautious on account of the complicated conditions which arose from the tire surplus which existed, dealers ordered conservatively and sought quicker turnover of stock on their shelves. In many instances they found they had been too conservative.

Tire production now is averaging over

90,000 a day in Akron. By next April or May, manufacturers say, tire production in all probability will rise to new marks and may approach 125,000 tires a day in the Akron district alone.

Average Gasoline Price in 30 Cities Lower Than In 1921

NEW YORK, Dec. 4—Statistics gathered show that the tank-wagon price of gasoline in 30 cities averages 19.4 cents a gallon, which is 3.5 cents a gallon below mid-August and 5 cents under 1922's high of 24.4. This also is eight-tenths of a cent under the low of 1921 and about 10 cents under the average of 29.3 on Jan. 1, 1921.

The present tank-wagon prices in the leading cities are: Atlanta, Ga., 19; Baltimore, 21.5; Birmingham, Ala., 17; Boston, 24; Butte, Mont., 22.5; Chicago, 18; Cleveland, 20; Dallas, Tex., 20; Denver, 19; Des Moines, 19.1; Detroit, 19.4; Houston, Tex., 19; Indianapolis, 18.8; Kansas City, Mo., 17.5; Louisville, 19; Memphis, 15.5; Milwaukee, 18.6; Minneapolis, 19.5; Newark, N. J., 21.5; New Orleans, 16; New York City, 24; Omaha, 18.25; Philadelphia, 21; St. Louis, 18.2; St. Paul, 21.5; San Francisco, 19; Seattle, 21; Tulsa, Okla., 16; Vicksburg, Miss., 17; Wilmington, Del., 21.

ST. LOUIS SHOW FEB. 12-17

ST. LOUIS, Dec. 4—The 1923 Spring show of the St. Louis Automobile Dealers' Association will be held in the heart of the automobile retailing district, in the large building of the Universal Manufacturing Co., at Twenty-seventh and Olive streets. The dates are Feb. 12 to 17, inclusive. R. E. Lee, manager of the association, will be in charge.

GILMER BUILDS ADDITION

PHILADELPHIA, Dec. 4—L. H. Gilmer Co., manufacturer of automobile belts and other industrial webbing and belting, is erecting an addition to its plant at Tacony, Philadelphia. The new unit will afford 25,000 square feet of warehouse space, equipped with the latest devices for handling freight, and a 6,000 square foot boiler plant.

BUICK'S NEW FILM

DETROIT, Dec. 1—"The Story of the Valve-in-Head Motor" is the title of a new moving picture film to be presented by the United States Department of Commerce in cooperation with the Buick Motor Co. of Flint, Mich. The photography has been completed and the film will be released early in December.

TALK CHEVROLET SERVICE

TORONTO, Ont., Nov. 30—Nearly 100 Chevrolet dealers and service mechanics gathered here this week to discuss and solve some of their service problems. They came from all over central and western Ontario, and were the guests of the Chevrolet Motor Co. of Canada, Ltd., of Oshawa.

Used Car Cooperation Book Will Be Ready in Few Days

Manual, Written By Buckman, Sanders and Adair to Help Dealer Problem

NEW YORK, Dec. 1—The Manual of Used Car Cooperation, compiled by the National Association of Automobile Show and Association Managers, will be off the press within a few days, when it will be available for trade association secretaries and dealers desiring to study it for suggestions regarding used car cooperation in their communities.

The manual has been priced at \$2, which covers the cost of compilation, printing and distribution.

The book confines itself to the one subject of suggesting a definite method by means of which a dealer association or a group of dealers can cooperate to eliminate losses resulting from over-all allowances on used cars. It contains all the necessary forms for a cooperative plan and instructions for using the forms.

Its authors are Herbert Buckman, manager, Cleveland Automobile Manufacturers and Dealers' Association; L. B. Sanders, secretary, Boston Used Car Statistical Bureau; Neal G. Adair, editor Motor World and executive secretary, National Association of Automobile Show and Association Managers.

The book may be obtained by application to the association, 239 West 39th Street, New York.

MAKES 35,000,000 SPARK PLUGS

TOLEDO, O., Nov. 25—At the convention here this week of the salesmen of the Champion Spark Plug Co., it was announced that the total production of Champion plugs this year will be about 35,000,000. Addresses were made by R. A. Stranahan, president; F. B. Caswell, general sales manager; Theodore F. Manus, advertising counsel; Mort. C. DeWitt, vice-president; F. D. Stranahan, treasurer; O. C. Rohde, chief engineer, and George Nason, advertising manager.

LEVENE ENLARGES

CHICAGO HEIGHTS, Ill., Dec. 4—The Levene Motor Co. of Philadelphia, manufacturer of automobile repair parts and gears, has taken over the plant here of Hicks-Parrett Tractor Co., and will continue to operate it, furnishing service and parts. It is also planned to put a new tractor on the market shortly, according to B. N. Levene, service manager.

CHICAGO FREE EXHIBIT

CHICAGO, Dec. 2—The sixth annual free automobile exhibit in the Greer Building, adjoining the Chicago coliseum, will be held during the Chicago National Automobile Show, Jan. 27 to Feb. 3. A number of manufacturers of accessories and bodies have been assigned space.

Some Factories In Detroit District Increase Production

Others Reduce Output As Winter Checks Demand for Open Models

DETROIT, Dec. 4—Production figures for factories in the Detroit district show November to have run considerably ahead of production in November, 1921, and to have maintained a pace which will give the industry another approximate 200,000 month. Manufacturing in December will show a gradual decline, owing to the lateness of the season and the holiday inventory periods but will compare favorably with any other similar month.

While there is a continued large amount of buying in the closed models, most of the open models are going to dealers for stocking over the turn of the year. This is especially true in the middle priced car field, there being still a large amount of buying of open models in the low priced and better priced lines. Price changes and new models in a number of lines have kept a larger volume of business coming through than usual at this time of year.

Ford Sales Exceed 100,000

Ford Motor Co. sales during the month will exceed 100,000, practically all of which is in the domestic field, and due largely to the recent price cut. Sales following the reduction have exceeded expectations and will necessitate the manufacture of 100,000 vehicles in December despite inventory period. Closed car business is about 25 per cent of the total. Tractor manufacturing is approximating 200 daily.

Chevrolet Motor Co. is building 1200 cars daily and is increasing this total in December. Business is running strong on closed cars and orders are several months ahead in practically every model. There is a large ready market for its open models and the company is intensifying its sales efforts in all territories.

Companies manufacturing enclosed cars of the utility type report these behind orders in almost every instance. From ten to thirty days are required for deliveries. In this group are Dodge, Maxwell, Hupp, Dort and Studebaker. Schedules in these plants on all models show Dodge to be manufacturing about 500 daily; Maxwell 200 daily; Hupp, 100; Dort, 100, and Studebaker 400 in all plants.

Buick is continuing its heavy production to meet business occasioned by the popularity of its recent models. Schedules in all plants, including Canada, approximate 600 daily, a large part of which is in its touring sedans. Hudson-Essex are building about 250 daily with coach models leading in popularity. Closed car Hudson-Essex business is now close to 60 per cent.

Better priced lines are running close to capacity. Cadillac with new low prices in effect is building about 100 daily and will increase this total in December. Packard is increasing its production in December to 2250 a month, a 25 per cent increase over its earlier year schedules. Lincoln production at the rate of about 30 daily is sold through the winter. Wills Ste. Claire, despite its temporary financial difficulties, is operating at the rate of about 20 cars daily.

Oldsmobile and Oakland are continuing operations at the rate of about 100 daily. Paige-Jewett schedules call for production of about 100 daily. Reo is approximating 100 daily in car and speed wagon. Rickenbacker is building about 20 cars daily and has scheduled 10,000 cars in 1923, or 40 daily. Durant Motors is building about 100 daily each in both Durant and Star models. Gray is building 100 daily and will increase this steadily to upwards of 200 daily by the first of the year.

Earl Motors under the change in control which places George C. Scobie in the presidency, is outlying an extensive production for 1923 and is gradually increasing operations. Columbia has outlined a schedule of about 28,000 for 1923 on which it is now beginning. Liberty is now arranging for its 1923 output and is operating on a regular winter schedule. Saxon is out of production pending completion of its financing.

Nash and Velie Busy

KENOSHA, Wis., Dec. 4—Nash Motors Co. is operating on a daily schedule of about 170 four and six cylinder cars, production being well maintained for this season.

MOLINE, Ill., Dec. 4—Production of the Velie Motors Corp. is somewhat restricted by scarcity of enclosed bodies, but a daily output of about 30 cars is being maintained, which is only slightly below the normal for the last few months.

Speakers' Bureau Books Many Men to Address Associations

PEORIA, Ill., Dec. 2—Considerable use of the speakers' bureau recently established by the Illinois Automotive Trade Association is reported by Manager F. C. Zillman. The following dates have been scheduled for the near future: Dec. 5, A. G. Thede of the Velie Motor Co., Peoria, at the monthly meeting of the Quincy Automobile Trades Association; Dec. 8, James Levy, head of a Chicago Buick company, at the Henry County Automotive Trade Association, Kewanee; Dec. 8, A. R. Kroh, of the Goodyear Tire & Rubber Co., at the regular meeting of the Peoria Automobile Dealers and Accessories Association; Dec. 15, F. C. Zillman, manager of the Illinois Automotive Trade Association, at regular meeting of the Rockford Automobile Trade Association.

Ohio Dealers Holding Three-Day Convention This Week

Program of Toledo Meeting Includes Addresses by George M. Graham and E. E. Peake

TOLEDO, Dec. 2—George M. Graham, vice-president of the Chandler Motor Car Co., will address the Ohio automotive dealers at their annual convention in Toledo on Dec. 6, 7 and 8, on "The Dealer and 1923."

Graham will be remembered by dealers of Ohio as having addressed their organization in their annual convention four years ago at Akron.

Other speakers will include E. E. Peake, of Kansas City, Mo., prominent in national and local dealers' affairs, and B. W. Ruark, Field Secretary of the Automotive Equipment Association of Chicago. Peake will speak on "Co-operation," and Ruark on "Equipment Merchandising and Accounting."

Among dealers of Ohio who take prominent part in opening discussions, will be A. E. Mitzel, Canton Motor Car Co., Canton; A. C. Mundew, Powertown Tire Corp., Cincinnati; C. E. Schmitt, The West Side Motor Co., Hamilton; J. G. Collison, Banner Electric Service Co., Dayton; and Kay G. Mengert, Transport Truck Sales Co., Toledo.

Better service and higher standards, advocated by experts, will be the order of the three-day convention. Motor vehicle legislation will also form an important subject.

FIRST SO. DAKOTA MEET

SIOUX FALLS, S. Dak., Dec. 1—The first annual meeting of the Automobile Trades Association of South Dakota will be held Jan. 15 in Sioux Falls. The membership mark is set at 1000. The enrollment now is 135. Preliminary steps to make a statewide organization of the industry were taken at a meeting of 35 men, representing 7 towns of the state, Nov. 24 in Huron. The directors chosen are: O. M. Phelps, Huron; Iver Dybdal, Brookings; H. J. Hanson, Watertown; E. R. Judy, Aberdeen; J. J. Carson, Wessington Springs. The directors elected Phelps as president, Hanson as vice-president and Judy as secretary.

PROGRESS OF AMERICAN STEAM

ELGIN, Ill., Dec. 1—Rapid progress is being made in the installation of machinery in the new plant of the American Steam Truck Co. here which was purchased from the Duty Motor Truck Co. The first consignment of bodies for American steam passenger cars has been shipped from an Indiana body factory and steps are being taken to have cars coming through in regular production within 30 days. The engines will be made in the Elgin plant.

Receiver Appointed for Wills Ste. Claire Factory

Court Action Is Friendly to Enable Rehabilitation of Company, Declares C. H. Wills

DETROIT, Dec. 2—Application for appointment of a receiver for C. H. Wills & Co., maker of the Wills Ste. Claire car, was made this week in Federal Court to permit of a reorganization and rehabilitation of the company and to clear up the financial difficulties under which the company has been laboring. The petition was filed by the Michigan Malleable Iron Co., acting at the behest of bankers and major creditors, and with the consent of C. H. Wills, president of the company. Security Trust Co., of Detroit, as receiver, will be in charge of the operation of the plant.

"The company is solvent," Wills said in a statement following the receivership, "and the court action has been taken as a means of rehabilitating the company and placing it on a stronger financial basis. It should be remembered that the company went into production late in 1920 when the motor car business was beginning to suffer in the general depression, but despite this fact the company made an enviable showing. Operations of the company will be uninterrupted."

Production is Normal

At the Marysville plant operations were being maintained normally for the season, it was said, and business declared to be in satisfactory volume. Production was approximating 65 per cent enclosed models. Preparations for an appraisal will be made immediately and the plant will be closed temporarily while this is in progress. It is expected that the affairs of the company will permit of an early sale, probably soon after the first of the year.

The receivership comes as no surprise to those in the industry and follows a series of meetings covering several months, in which bankers and creditors discussed with officers of the company plans for placing it on a firm foundation. Built and equipped during the period of high prices, the company was compelled to start manufacturing in a period of falling prices and consequently has been severely handicapped.

The receivership will give it an opportunity to start anew on a basis compatible with present day costs. There is little doubt but that the plant will be bought in by the present holders, and that most of the present officers will be continued. There have been reports of efforts to sell their interests by bankers to Ford Motor Products Corp., and several other companies in the industry, but these never reached beyond the report stage.

NEW DEALERS APPOINTED

SPRINGFIELD, Mass., Dec. 1—A. L. Bengle has been authorized to sell Hudson and Essex cars in the Indian Orchard district of Springfield, Mass., and has opened a new sales and service building. T. J. Connelly, formerly with the J. M. Bownes Co., Pittsfield, Mass., has been allotted the Great Barrington territory for Hudson and Essex. Other local dealers just designated by J. S. Harrington, Inc., Hudson and Essex distributors in Springfield, are:

Walnut Street Garage, Palmer, Mass.; William E. McGrath, Ware and Monson, Mass.; Frank W. Kellogg, Feeding Hills, Mass.; Merrill's Garage, Thompsonville, Conn.; John Daub, Clarksburg, Mass.; Rutherford & Co., Williamstown, Mass.; O. R. Hutchinson, Lenox, Mass.; Philip Robinson, Blanchard, Mass.; Live Wire Garage, Chester, Mass.; Harold E. Perkins, Huntington, Mass.; Frank Holmes, Russell, Mass.; Madson & Fowles, Southampton, Mass.; Clifford W. Clark, Woronoco, Mass.; Herbert Hieres, Granville, Mass.

"Danger" Tag For Speeders' Cars

SACRAMENTO, Cal., Dec. 2—San Diego has put into effect a plan proposed by F. H. Bacon, mayor, for the checking of motorists with a tendency to speed, which is to be adopted by other cities in the state, according to reports filed with the State Motor Vehicle Department here. The plan is to attach to the front and rear of the speeder's car a large red placard, bearing the word "DANGEROUS" printed in black. The judges give first offenders the option of carrying this placard for a certain number of days or going to jail for a similar period. Second and third offenders get the jail sentence without the option of being tagged as dangerous.

TRACTOR COMPANY TO LIQUIDATE

COLUMBUS, O., Dec. 1—Stockholders of the Ohio Tractor Co., of Columbus, at a specially called meeting Nov. 29 voted to dissolve the corporation and liquidate its assets. This action was taken upon the recommendation of the board of directors which caused an exhaustive survey to be made of tractor conditions and the future market of the class of tractors made by the company.

PREMIER SALE AGAIN POSTPONED

INDIANAPOLIS, Nov. 30—The court sale of the Premier Motor Corp. set for today after a previous postponement was again set forward, to Dec. 5. It is understood that there are several bidders who will attempt to obtain the property and that today's postponement was due to inability of one of the interested bidders to arrive in time for the court sale.

AUTOMOBILE MONTHLY BULLETIN

CHICAGO, Dec. 1—The Chicago Automobile Assn. has inaugurated publication of a monthly bulletin listing all models of cars sold in Chicago, giving the F.O.B. factory prices and the prices delivered in Chicago.

Weather Conditions Favorable to Winter Driving, Sales Hold

Milwaukee November Sales Said to Be Largest Ever Recorded In That Month

MILWAUKEE, Wis., Dec. 4—Weather conditions thus far this winter have been favorable to retailing of passenger cars and a fair demand, better than usual at this season, is reported by nearly all dealers. November sales are said to aggregate the largest number in that month ever recorded. While the total is considerably below October, the showing is regarded with a great deal of satisfaction.

Efforts are now being made on the part of dealers to get cars for display and stock. Some are endeavoring to get at least two cars of the complete line of models announced for 1923 from their factory or factories, so that they will have a full showing for their sales floors and another in reserve for their exhibits at the annual Milwaukee-Wisconsin show on Jan. 20 to 27. This is a more difficult matter than it would appear on the surface, for current sales are taking more of certain models, principally coupes and sedans, that can be had from the factory, and distributors and dealers in other large cities are equally as anxious as local interests to cover show and stock needs.

Local dealers are invoking a variety of methods to produce immediate sales, there being none of the customary relaxation of effort in soliciting prospects that has characterized late November and December dealer activities. Most of the sales now being made are for spring delivery, with some owners satisfied to turn in their used cars now and take advantage of the credit in March or April. This is a fairly satisfactory solution, for it enables dealers to make effort at turnover of used car stocks without the investment actually in effect.

GASOLINE USE DECLINES

WASHINGTON, Dec. 1—Statistics compiled by the Bureau of Mines shows that consumption of gasoline fell off 12.98 per cent during September. Consumption of gasoline in September was, however, approximately 16 per cent greater than in September of last year.

Production of gasoline in September amounted to 536,491,988 gallons, which is a decrease of 2.45 per cent from the August output, but an increase of 28.68 per cent over the figure for September, 1921.

DURANT'S 14 MONTH MARK

NEW YORK, Dec. 1—Durant Motors reports a total of nearly 52,000 automobiles built in Durant plants within the last 14 months. Of this total, 5,600 were Stars. The Durant plant at Elizabeth, N. J., will be given over to Star production exclusively until the first of the year.

Automotive Manufacturers' Association Is New Name

Former Association of Automotive Manufacturers Makes Change

CHICAGO, Nov. 30—A new name, Automotive Manufacturers' Association, was adopted at a meeting here this week by the organization heretofore known as the Association of Automotive Manufacturers. New constitution and by-laws also were adopted.

This association has been in existence since 1916, but until early this year its activities were confined chiefly to Chicago. It has now become a national organization with nearly 100 members. George Fritz is the general manager. New officers and directors under the new constitution are to be elected within the next 60 days. General offices are maintained in the Consumers' building, Chicago.

Philadelphia's 1923 Show to Be Held From Jan. 13 to 20

PHILADELPHIA, Dec. 2—Philadelphia's 22nd annual automobile show will be held from Saturday night, Jan. 13, to Saturday night, Jan. 20, at the Commercial Museum building, Thirty-fourth street below Spruce street. The show committee, consisting of Louis C. Block, chairman; J. R. Gomery, treasurer; Walter G. Herbert, secretary; Ralph W. Cook, Walter Y. Anthony, L. S. Powers, James Sweeten, Jr., and J. R. Pierpoint, made this decision at a meeting held at the headquarters of Philadelphia Automobile Trade Assn. Another member is to be elected to this committee, due to the resignation of A. E. Maltby.

With an active membership of sixty automobile dealers, representing nearly 90 makes of cars, a record-breaking show is assured. While there have been some changes in dealerships during the last year, and several concerns have withdrawn from business, new ones have come into the field and virtually the same number of cars as last year will be exhibited, with a few additions.

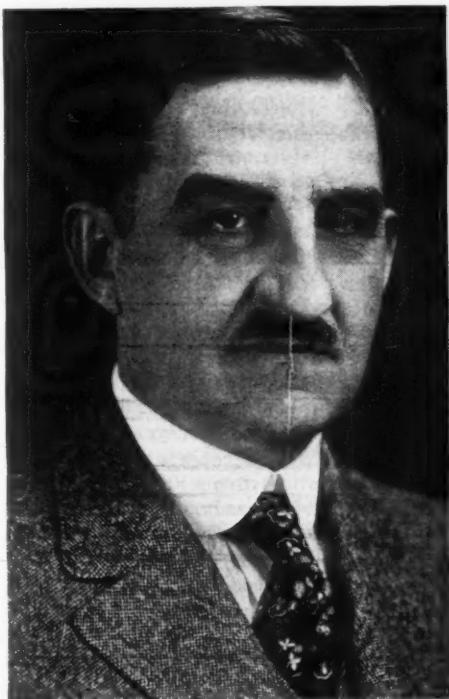
TWO AUTOMOTIVE BUILDINGS

San Francisco, Nov. 30—Business in the automotive merchandising line is so good in the Pacific Northwest and the Pacific Southwest that two big buildings are being erected, one in Portland and one in Los Angeles, to house growing firms in this line. The Howard Automobile Co., distributors of the Buick for this territory, is erecting a four-story concrete and steel building in Portland, Ore., to be devoted exclusively to the sale, service and repair of Buicks. Don Lee, distributor for the Cadillac, is building a seven-story structure at Seventh and Bixel Streets, Los Angeles, for the

exclusive sale and distribution of the Cadillac.

In Los Angeles the used car department will be continued on Main Street, and the Don Lee Coach & Body Works on another street, giving this distributor a total of 220,000 square feet of space in Los Angeles, a few feet more than in the northern headquarters in San Francisco, where the nine floors are now being converted into a "24-hour automobile department store," with night and day service and sales. Lee believes that the better the building and the finer the sales and showrooms, the greater the sales.

Automobile Dealer Honored



F. W. A. VESPER

President of Vesper-Buick Auto Co., St. Louis, Mo., has been re-elected president of the St. Louis Chamber of Commerce.

DORT REDUCES INDEBTEDNESS

DETROIT, Dec. 1—Dort Motor Car Co. during the year has made a 50 per cent reduction in its indebtedness of more than \$1,500,000, according to a statement by F. A. Aldrich, treasurer of the company, to financial and commercial companies. This is regarded as highly satisfactory by the company in view of depression at the outset of the fiscal year, Nov. 1, 1921.

LOUISVILLE SHOW IS SUCCESS

LOUISVILLE, Ky., Dec. 1—Results of enclosed car week were highly satisfactory to the 20 members of the Louisville Automobile Dealers' Assn. who took part in it. There were 53 automobiles sold which dealers attributed directly to the results of advertising, publicity and special decorations in connection with the occasion.

Columbia Is Scheduling a Production of 27,000 for 1923

Many New Dealers Added to List of Company's Agents in Various Towns

DETROIT, Nov. 30—Columbia Motor Car Co. is scheduling a production of 27,000 cars for 1923 and will start operations on that basis the first of the year, according to a report to stockholders mailed this week. Many new sales connections have been made in important cities, the statement declares, and these, with the development of merchandising plans, will absorb production.

Among the cities in which new dealer contracts have been signed are Atlanta, Chicago, Indianapolis, Milwaukee, Philadelphia, New York, Brooklyn, Portland, Ore.; Seattle, Spokane, Boston, Detroit, St. Paul, Portland, Me., and Bangor, Me.

Dallas Association Changes Name to "Automotive" Trades

DALLAS, Tex., Dec. 2—The name of the Dallas Automobile Trade Assn. has been changed to the Dallas Automotive Trades Assn., which will immediately be incorporated under the laws of the State of Texas. A new set of by-laws and constitution, which broaden the scope of activities of the association, have been adopted and provisions made for the employment of a full time executive secretary. This executive secretary will take the place of the recording secretary and will be paid a salary. In the future the association will meet twice monthly.

At the last meeting the following officers were elected for the coming year: William Morris, president; R. C. Langley, vice-president, and George W. Goodwin, secretary-treasurer. Morris succeeds F. E. McLarty.

HAYNES PRICES INCREASED

KOKOMO, Ind., Nov. 30—Price increases ranging from \$200 to \$280 on six of its models have been announced by the Haynes Automobile Co. The revised list is as follows:

"55" Standard—	Old Price	New Price
Roadster	\$1545	\$1545
Phaeton, 5 Pass.....	1495	1695
Coupe, 3 Pass.....	2095	2095
Sedan, 5 Pass.....	2395	2595
"55" Sport—		
Roadster	1895	1895
Phaeton, 5 Pass.....	1895	1950
Coupe	2195	2195
Sedan	2695	2695
"75" Standard—		
Roadster	2395	2395
Phaeton, 4 Pass.....	2395	2395
Phaeton, 7 Pass.....	2395	2595
Coupe, 5 Pass.....	3095	3350
(Brougham)		
Sedan, 7 Pass.....	3395	3675
"75" New Models—Sport—		
Phaeton, 7 Pass.....		2700
Phaeton, 4 Pass.....		2700
Coupe, 5 Pass. (Brougham)....		3475

Staff Meetings Solve Service Problems

General Motors Men Form Club to Study Questions

Aim to Emphasize the "Serve" in Service and Take the "Ice" Out of It

DETROIT, Dec. 1—Service managers and other men interested in the service problems of General Motors divisions have formed an organization to discuss individual questions and to pool their knowledge for the benefit of the service station and the "boss"—the customer. In general, the idea is to emphasize the "serve" in service and to take the "ice" out of it altogether.

Under the chairmanship of M. W. Franklin, a number of men in the General Motors organization have already had their first meeting, at which it was evident that no service problem had any remote chance of remaining unsolved after the crowd's combined ideas could be formulated. The meetings will be held regularly and often, and short, to-the-point talks have been established as the rule.

Roll Call of First Meeting

A roll-call at the first meeting showed the following present: H. A. Brown, Jr., manager Motor Bearing Division, Hyatt; F. G. Carpenter, service manager, Klaxon; Albert Champion, president and general manager, A. C. Spark Plug Co.; Earl E. Eby, service manager, Remy; W. V. Faunce, distributor, Oldsmobile; M. W. Franklin, special service study, General Motors; E. C. Garland, service department, Cadillac; E. J. Graef, service manager, Dayton Engineering Laboratories; L. H. Gaylord, resident engineer, New Departure; R. M. Hatfield, service manager, Olds Motors Works; N. A. Hawkins, director sales, advertising and service, advisory staff, General Motors; A. K. Hebner, president, Bearings Service Co.; H. T. Hickey, advisory staff, General Motors; Ross Hopkins, motor equipment division, Klaxon; G. H. Kerr, sales manager, du Pont Company; J. W. Meeks, service manager, Harrison Radiator; C. S. Mott, Detroit, executive vice-president and chief advisory staff, General Motors; J. F. McLain, service department, Oakland; M. P. Nolan, technical manager, Overseas Motor Service; S. V. Norton, service manager, GMC Truck; J. W. Parry, technical department, United Motors Service; R. E. Smithson, service manager, Delco Light; W. M. Warner, service department, Cadillac; H. G. Weaver, advisory staff, General Motors; P. E. West, assistant to technical advisor, General Motors Export Co.; Walter C. Boynton, advisory staff, General Motors.



First meeting of General Motors Staff Organization to discuss service problems

OCTOBER PRODUCTION 238,514

WASHINGTON, Dec. 1—Figures received by Department of Commerce through the Bureau of the Census place the total production of passenger cars in October at 217,098, compared with 187,128 in September, while truck production amounted to 21,416 as against 18,656 in September. In October, 1921, production totaled 134,734 passenger cars and 12,813 trucks. Total output of cars and trucks in October was 238,514.

The following table gives the total production for each of the last four months, with corresponding figures for the same months of last year. With a few exceptions, the reports each month are from identical firms and include approximately 90 passenger car and 80 truck manufacturers. October figures are subject to slight revision when all reports have been received.

Passenger Cars		
	1922	1921
July	224,057	165,574
August	249,225	167,705
September	187,128	144,669
October	217,098	134,734

Trucks		
	1922	1921
July	21,357	10,766
August	24,200	13,080
September	18,656	13,648
October	21,416	12,813

BESSEMER REDUCES PRICE

PHILADELPHIA, Dec. 2—Bessemer Motor Truck Co. announces price reductions on its two light models. The reduction amounts to \$285 on the 1-1½ ton model and \$405 on the 1½-2 ton model.

Complete new prices for all models are as follows:

	Old Price	New Price
1-1½ ton	\$1735	\$1450
1½-2 ton	2395	1990
2½-3 ton	2895	2895
4-5 ton	3695	3695

FORD'S OCTOBER PRODUCTION

DETROIT, Dec. 1—Ford Motor Co.'s October production in its American plants totaled 121,765 cars and trucks, approximately 32,000 more than any previous October. September was 89,000, and in the foreign plants October showed an increase over September in each place.

Haynes Adopts New Sales Policy in Southern States

KOKOMO, Ind., Dec. 4—Release of four states, Alabama, Mississippi, Louisiana and Tennessee and portions of Kentucky, Arkansas and Indiana, from the selling franchise of the Charles W. Tway Co., Haynes distributors at Atlanta, Ga., has been announced by Gilbert U. Radoye, director of sales and advertising for The Haynes Automobile Co., Kokomo, Ind.

An intensive merchandising campaign to sell more Haynes cars is now being inaugurated in these states. Haynes district salesmen are being sent into this field for the purpose of establishing distributors and direct dealers in all the leading cities.

Recently the state of Texas was released from the franchise of the Charles W. Tway Co. Haynes distributors and direct dealers are now being established in that state. Although this action was taken only a few weeks ago, Texas is already stirring under the concentrated effort on the part of the Haynes company and it is expected that more Haynes cars will be sold there than at any time in the state's history.

RICKENBACKER OUTPUT 5000

DETROIT, Dec. 2—Rickenbacker Motor Car Co. will complete its first year of operation with a total business of about 5,000 cars, a record which is considered eminently satisfactory, and a total which will be doubled in the coming year. These figures on the business of the company were furnished by President B. F. Everitt in a statement accompanying announcement of a five per cent cash dividend to be paid Feb. 1.

SALES INCREASE 3.9 PER CENT

NEW YORK, Dec. 4—Reports from members of the Motor and Accessory Manufacturers' Association show that sales in October, 1922, increased 3.9 per cent over the preceding month and that for the first 10 months of this year the total sales amounted to \$347,609,220, or \$132,916,148 more than for the corresponding period of 1921.

William Gray Takes Over the Gray Canadian Distribution

Similarity of Names is Only Coincident; Klingensmith to Attend Meet

DETROIT, Dec. 1—Gray Motor Corp. has closed a sales agreement with William Gray Sons-Campbell, Ltd., of Canada, whereby the latter company will take over the sale of Gray in all parts of Canada and will distribute them through their dealer organization in addition to the Gray-Dort line of cars now being handled, and other products of subsidiaries of the parent holding company. The closing of the sales contract does not indicate that the Gray car for the Canadian trade will be made at once in the Chatham plant of the Gray-Dort company, but Gray officials declare that such a policy may be instituted in about two years. For the present the cars will carry the 35 per cent duty imposed by the Canadian tariff, which will bring the price on the open models close to \$700, delivered.

This will not conflict with the Gray-Dort line, however, the price on which approximates \$1200 on the four and \$1500 on the six. William Gray Sons-Campbell, Ltd., is second only to Ford in the manufacture of one line of cars in Canada. It was organized in 1855 by William Gray as a wagon company, and entered the automobile field about seven years ago when an arrangement was made with Dort Motor Car Co. for the manufacture of this line in Canada under the title Gray-Dort. The company has been successful and has built up a strong distributor organization which will now be given the advantage of handling a low priced line.

President F. L. Klingensmith of Gray Motor Corp. will attend a big distributor convention of the Gray-Dort organization at Chatham this week, at which the addition of the Gray line will be announced. No time will be lost in beginning sale of Grays through the Canadian organization and by Jan. 1 business is expected to be in full swing. It is estimated that \$1,500,000 worth of cars will be placed in the Canadian market in 1923.

The name Gray entering into the Canadian title and the title Gray Motor Corp. is only a co-incident, the two families not being directly connected. The William Gray Sons-Campbell company is now headed by Robert Gray, a son of the founder, William M. Gray, vice-president of the company, closed the sales agreement with Gray Motor Corp.

GOOD BUSINESS AT MOBILE

MOBILE, Ala., Nov. 30—Conditions in the territory surrounding Mobile are much improved and an excellent trade for the winter months is expected. With Alabama back in the position of the third cotton producing state in the

South, and with a crop estimated to be in the neighborhood of 850,000 bales, which will be sold at an excellent price and which will be required almost as soon as bought, Mobile cotton dealing and shipping concerns are looking for an excellent business this winter and next spring, at least.

Portland's 14th Annual Show to be Held Feb. 3 to 10, 1923

PORLAND, Ore., Dec. 1—Portland's fourteenth annual automobile show will take place Feb. 3 to 10, the date having been officially set by the board of directors of the Automobile Dealers' Association of Portland, under the auspices of which, as usual, the big event will be held. This is a couple of weeks later than the show has been held each year for the past two years, but is looked upon as a more favorable date, coming as it does after the big eastern shows have closed, after new models have been brought out and probably after price readjustments which may be planned have been made. The date will also allow the dealers to jump out of the show into early spring business, and not lose impetus through a period of quiet, as seemed to be the case last year following the show. The event will be held in the municipal auditorium, the same building where the show has been held for several years past. In order to provide for a display on a larger scale than ever before, plans for constructing a temporary addition a block long and taking in on the street on the north side of the auditorium are being taken up with city authorities.

Ralph J. Staehli, secretary of the dealers' association and manager of the show last year, will again be at the helm this year, acting under the general direction of the board of directors of the Automobile Dealers' Association of Portland, of which A. S. Robinson is president and C. L. Boss vice-president.

AUBURN ADDS TO PLANT

AUBURN, Ind., Nov. 30—The capacity of the Auburn Automobile Co.'s factory at Auburn, Ind., has been increased by the installation of a complete department for drying paint on bodies. This addition has been necessary to take care of the increased production at the present time and the anticipated production of 1923 because of the addition of the smaller six to the Auburn line.

PORLAND TRADES ELECTION

PORLAND, Ore., Nov. 30—The following officers of the Portland Automotive Trades Association were elected for the coming year at the annual session of the association: President, V. C. Unden; first vice-president, L. L. Blumenthal; second vice-president, H. M. Nisbet; third vice-president, John Weber; secretary, Guy Spencer; treasurer, F. H. Hildebrand; directors, Don G. Bates and A. E. Foss.

150 Delegates Attend Two Day Meet of Pennsylvania Dealers

Association Favors Laws Helpful to Automotive Industry; Seek Brake Inspection

HARRISBURG, Pa., Nov. 30.—About 150 delegates from 30 points in the state attended the two-day convention of the Pennsylvania Automotive Assn., held in the Capitol Building here. Officers were elected as follows: President, George G. McFarland, Harrisburg; vice-presidents, J. Burton Arbuckle, Erie; E. T. Satchell, Allentown; J. H. Leppert, Johnstown; George A. Hoeveler, Pittsburgh, and Otto E. Conrad, Scranton; secretary-manager of the association, L. H. Hagerling, Erie; treasurer, E. A. Clark, York; secretary to the treasurer, Harry Schroeder, York; secretary to the board of directors, Roy W. Shreiner.

The association went on record in favor of various proposed laws, helpful to the automotive industry, including safety brake inspection as approved by the National Safety Council; more flexible and less restrictive motor vehicle regulatory enactments; favoring a road bond issue to restore the exhausted state fund for road building purposes and recommending work cooperative with the National Automotive Dealers' Assn. and other national bodies in attempting to secure the repeal of burdensome taxes.

It was unanimously voted to hold the next convention in Erie.

The list of speakers for the two days included the following:

President McFarland; Lieutenant Governor E. E. Beidleman, address of welcome; C. A. Vane, St. Louis, general manager of the N. A. D. A., on "Rebuilding for Permanency;" Thomas McDowell, field representative of the State Highway Department, on "Highways, Past and Present;" Benjamin G. Eynon, registrar of motor vehicles, automobile division, Pennsylvania State Highway Department, on "Evils of the Highway License Bureau;" Ray Sherman, merchandising director of the Automotive Equipment Assn., Chicago, on "Shop Profits," and "Ask 'Em to Buy;" August Ahrens, business builder, New York; Dr. J. M. Thomas, president of Pennsylvania State College, on "Education for an Age of Machinery," and A. R. Kroh, educational department of the Goodyear Tire & Rubber Company, Akron, O., on "How to Get Efficiency from Sales and Service Organizations."

Kroh's address made a great impression on the audience. In it he stressed the value and importance to the automotive industry of its "marvelous trade journals, the best in the world," deplored the men who were so behind the times as to neglect to read them.

The convention adopted a slogan proposed by "Doc" Williams, Ford agent of Harrisburg, "Drive on the Right and Walk on the Left," as being in the interest of both motorists and pedestrians.

1923 To Surpass 1922, Says Reeves After Tour of Plants

Indications Point to Greater Demands for Enclosed Cars, Leader's Belief

NEW YORK, Dec. 2—After spending two weeks on the road visiting from 25 to 30 plants in Ohio, Indiana, Illinois and Michigan, Alfred Reeves, general manager of the National Automobile Chamber of Commerce, is back at his desk again, convinced that 1922 motor vehicle production will reach the record-breaking total of 2,400,000, of which approximately 10 per cent will be trucks.

"I found that business generally has had a chance to get its second wind, live down many of the mistakes of the past and get set for 1923," Reeves said. "Next year promises to excel 1922, provided we can get enough enclosed bodies. That's the rub. The whole industry now has a new market in the demand for the closed car. This market will increase rapidly as the prices get closer to the open car prices and especially where the roads are improved. Closed car production in 1919 was 10 per cent of the total; in 1920, 17 per cent; in 1921, 22 per cent, while this year it will exceed 25 per cent, with the last quarter's production running 31 per cent of the total. In time it is expected that more than half the production will be the closed or year-around type."

Excess Capacity

"After visiting so many of our factories I am convinced that our industry now has an excess capacity for all its needs. It can make 3,000,000 vehicles if hard pressed during any year."

"Next year will find engineering and production on a very efficient basis, but distribution will be the big problem for all manufacturers. While thousands of dealers have gone out of business, the ranks have been pretty well replaced by new ones so we now have more than 33,000 merchants retailing motor cars and trucks, all of whom must be aided by the manufacturer in connection with financing his stocks and passing the vehicles on to the public."

"The big market we are enjoying now is the result of manufacturers taking their readjustments quickly, taking necessary losses and putting prices low enough to insure volume. Today's values are the greatest in the history of the industry and with increasing costs for materials and labor some price increases are not unlikely. We had considerable buying by those who should have bought cars in 1921, plus those necessary to replace the worn out production of 1916 and 1917. The 1917 production was 1,868,947."

"We will see still greater production next year, especially during the first six months, provided closed bodies enough are available. The industry normally makes 25 per cent of its year's produc-

tion in the first quarter, 31 per cent in the second, 24 per cent in the third and 20 per cent in the last quarter. The last quarter this year will be better than the average."

"Farmer buying will make for an increased production next year. Crops this year will bring a billion and a half dollars more than last and the farmers must have cars and trucks."

"The truck industry is more promising than it has been for some time but it needs more and better dealers and the elimination of some bad practices that have crept in during the depression, especially the selling of trucks on too small a first payment, with too long a time for full payment."

Forbes Is Elected Pierce-Arrow President; Sales Grow

BUFFALO, N. Y., Dec. 2—M. E. Forbes has been elected president of the Pierce-Arrow Motor Car Co., in the place of Col. Charles Clifton, who has, for the past year, filled the offices of both chairman of the board and president. Col. Clifton continues as chairman of the board.

For the past three years Forbes has been treasurer of the company and also vice-president and chief executive of the company for the last year. The affairs have shown very gratifying progress under his leadership.

S. O. Fellows, who has been with the company for many years and lately had been comptroller, was elected treasurer.

Sales and shipments are reported as making steady growth.

NEW DURANT BODY PLANT

NEW YORK, Nov. 30—Incorporation of the Hayes-Hunt Corp. at Dover, Del., with authorization to issue 1,000,000 shares of capital stock without nominal or par value, marks the debut of a Durant subsidiary which will build about 200,000 closed bodies a year for the big holding organization. It also means the construction of body building plants in connection with the six Durant and Star car building plants.

CHEVROLET OPENS NEW BRANCH

Charlotte, N. C., Nov. 30—Carrying out the program of expansion that has been adopted by the Chevrolet Motor Co., a factory branch of the company to handle the distribution of all cars for North and South Carolina will be opened in Charlotte Dec. 1. L. F. Garlock of Atlanta has been appointed manager for the new branch and he has been here the past week making plans for the opening. The office will be located at 8 E. First Street.

INCREASED WHEEL CONTRACTS

Lansing, Mich., Nov. 30—Increased contracts for wheels of all types being placed by motor car and truck manufacturers argue a substantial betterment in all lines of automotive industry for 1923, according to C. C. Carlton, secretary of the Motor Wheel Corporation.

"One Salesman, One Dealer, One Million!" A. E. A. Slogan

Ray Sherman Shows How Sales Can be Increased by Cooperation of All

CHICAGO, Nov. 30—"One Salesman, One Dealer, One Million!" This is the latest slogan of the merchandising department of the Automotive Equipment Association. It is the keynote of a new plan devised by Director Ray W. Sherman to demonstrate the increase in sales which can be brought about by intelligent and aggressive cooperation of manufacturer, jobber, salesman and dealer.

The plan is explained in detail in the latest issue of the Sales Executive, published by the merchandising department of the A. E. A. This is the plan which the sales executive of the jobbing house is urged to put in operation:

"Have each salesman turn in at once the name of one dealer with whom he is going to work. Better not ask for more than one dealer. Increasing this number may confuse the matter. Many salesmen will automatically work with more than one, but let's not ask for more than one."

"Make sure this name is turned in within a very few days. Then make a record of the salesman and his dealer in your office."

Tabulation Should Be Made

It is further explained that a tabulation should be made each month of the dealers' business for the purpose of showing increase. It is recommended that the dealer should be one who has contact with plenty of customers, but one whose sales possibilities have not been fully developed. The period of the experiment is to be for six months, ending June 1, 1923.

For the purpose of a goal to shoot at it is suggested in the literature that each salesman might be able to help his dealer increase his sales \$50 a week and that if 1000 salesmen did this with 1000 dealers it would mean a total additional volume of \$1,000,000 in new business in the six months period. Hence the slogan, "One salesman, One dealer, One million!"

CITY BUILDS TOURISTS' HOUSE

RICHMOND, Va., Dec. 1—Forty tourists enroute South celebrated the opening of Richmond's beautiful new tourists' house in Bryan Park last week. The house was built by the city at a cost of \$5,000 and contains every modern convenience known for the facility of the traveler. The building is stone, with fireplaces, showers, baths, laundry tubs, wood and coal furnished free by the city for tourists, and several acres of beautiful wooded park are furnished for campers wishing to pitch their tents or park their cars.

IN THE RETAIL FIELD

L. H. Nelson, with salesrooms on Franklin avenue, Ridgewood, N. J., has taken the agency of the Peerless Eight.

Anderson Motor Co., Rockhill, S. C., announces the appointing of Melchoir, Armstrong & Dessau, Limited, 116 N. Broad street, New York City, as export agents.

Garland Sales Co., 221 Woodward avenue, Detroit, has been appointed by the Anderson Motor Co. as distributor for the state of Michigan and the Province of Ontario, Canada.

Announcement is made by the Anderson Motor Co. that the Berg Auto Co., 746 Selby avenue, St. Paul, Minn., has been appointed distributor for the Anderson cars in the St. Paul territory.

Anderson Motor Co. announces that the Central Pennsylvania territory has been assigned to Ambler-Beaman Motor Co., Reading Pa., which will be distributors of the Anderson cars for that district.

Smith-Sauer Motor Co., distributor for the Case cars in northern Illinois and northern Indiana, has moved from 2534 Michigan avenue, Chicago, to 2436 Michigan avenue. The new salesroom and service station is three times as large as the old. The move was occasioned by the growth of the company's business, which has more than doubled in the last eight months.

Roskam-Scott Co., Inc., 1846 Broadway, is Columbia's new distributor in New York. The principals are well known to the trade in Manhattan, although this is their debut as a distributing organization. In Philadelphia, the Columbia-Kissel Motor Co., 250 N. Broadway, has been organized to distribute the Columbia in that city and in eastern Pennsylvania. The new firm formerly was known as the National Motor Sales Corp., distributor of the Maxwell-Chalmers line. The Karouze Automobile Co. of Indianapolis, formerly Stutz representative, has taken the Columbia franchise for that territory.

Knull Motor Co., 421 W. Washington street, Fort Wayne, Ind., has relinquished the Chevrolet agency and it will be taken over by a South Bend concern. The building now occupied by the Knull company will be leased by the C. L. Bornshein Motor Sales Co., now occupying a smaller building at 1020 Fairfield avenue.

Northern Indiana Motor Car Co. has remodeled the second floor of its building at 115 W. Washington boulevard, Fort Wayne, Ind., and will install an "Automobile Department Store" there for the handling of used cars. There is 3,000 square feet of floor space on this floor. C. B. Thomas, of Detroit, will be in charge.

Union Motors Co., Inc., headed by George Pearson, Jr., and George Walling, has been formed at Houston, Tex. The new company has taken over the Chalmers and Maxwell franchise and will distribute Maxwells and Chalmers in 27 counties.

Frank W. Hayes, pioneer automobile man of Amarillo, Tex., has obtained the Oldsmobile franchise for northwest Texas and parts of New Mexico. He is now establishing agencies in a score of towns and making arrangements for increasing business next year.

Johnson & Morris, of South Richmond, Va., have just been appointed associate dealers for the Maxwell in South Richmond.

Peck & Adler Co. of Syracuse, N. Y., has taken over the agency for the Davis car in nine counties. The company also has the agency for the Westcott car in four counties.

The A. A. Ledermann Co., Syracuse, N. Y., has been appointed distributor for the Cleveland car in Onondaga, Cortland, Cayuga, Madison and Oswego counties. Ledermann, who has been in the automobile business since 1898, and for 17 years has been selling cars.

Jennings Auto Sales Co., at Springfield, Ill., distributor of the Ford and Lincoln cars and Fordson tractors, entertained 60 members of its sales service, assembly and shop departments at the Sangamo club. Frank Jennings, president of the company, presided.

The White City Garage, Port Edwards, Wis., is a voluntary bankrupt with liabilities of \$1,136 and assets of \$175.

Walter Kazda, Manitowoc, Wis., has been appointed county dealer for the Moon and has taken over the former Swanson Garage, 209 N. Ninth street, as sales and service station.

J. P. O'Connell, Marshfield, Wis., Hupmobile and Overland dealer, has moved into new sales and service headquarters, being obliged to relinquish possession of the former O'Connell garage, which is being raised to make room for the new Marshfield postoffice.

P. L. Emerson of San Francisco has obtained the franchise for the sale of the Star car in San Francisco and San Mateo counties. R. H.

Mulch, sales manager for the Durant company at its Oakland plant, has announced the official appointment of Emerson.

The sales and service business of the Magee Motor Co. at Geneseo, N. Y., has been purchased by the Geneseo Valley Garage, Inc., a new firm of which Dr. James V. Sturgis of Geneseo is the principal stockholder.

George B. King, proprietor of the Auto Repair Shop at 209 W. Fourth street, Jamestown, N. Y., filed a voluntary bankruptcy petition in the United States district court at Buffalo, listing assets at \$2,497 and liabilities at \$3,285.

The Peerless Auto Sales Co., capital \$100,000, has been organized at Canton, Ohio, to deal in motor cars and trucks.

E. A. Neff, who has been identified with the sales department of the Columbus, O., Cole agency, has been appointed distributor for that line in Columbus and vicinity. The sales rooms will be at 19-21 N. Fourth street, and the service station on Goodall street will be removed to the new location.

Papers have been filed with the secretary of state increasing the capital of the Akron, O., Buick Co. from \$50,000 to \$100,000.

The Truck Part Co. has been organized in Atlanta, and has opened southeastern headquarters at 56 Auburn avenue, handling parts of all kinds for heavy and light trucks in the southeastern territory.

Shackleford Chevrolet Co. has been organized in Atlanta by C. B. Shackleford and associates, and has established a new Chevrolet agency at 444 Whitehall street.

The Palm Beach Motor Sales Co. has been organized and incorporated at Palm Beach, Fla., with \$10,000 capital, to establish an automotive agency and service station.

The J. C. Barrett Motor Co. of Birmingham has been appointed dealers for the Chevrolet. This concern also handles the Veline.

The Stevens Motor Co. of Birmingham has just been appointed dealer for the Chevrolet car. Frank Stevens, for a number of years with concerns handling light cars, is the president of this new concern. This addition to the Chevrolet dealers gives Birmingham two located in the downtown section and one in the suburbs.

The Gore-Wise Auto Co. has been organized in Montgomery, Ala., and will distribute the Durant and Star cars. Luther H. Goree and Emil Wise are the organizers.

The Bluff City Tire Co. is a new concern to open on automobile row at Memphis. It will distribute the Cupples tires. Albert Sterns, formerly of St. Louis, is president and manager.

Traffic Motor Truck Corp. has appointed William B. Staley, 11 W. Eager street, Baltimore, Md., distributor for Traffic trucks in that city.

Tire Manufacturers' Combined Sales, Inc., 624 S. Michigan avenue, Chicago, has been incorporated with a capital of 25 shares no par value, to manufacture and deal in tires, automobiles, supplies, etc.

More than 100 dealers of General tires in eleven southern states attended the annual sales convention of the General Tire & Rubber Co.'s southeastern forces held at the Cecil Hotel in Atlanta the latter part of November.

S. B. Quigley and associates, of Mobile, Ala., have recently organized and incorporated there the Quigley Motor Co., with a capital stock of \$25,000, to establish an automobile distributing agency for south Alabama territory.

H. B. Tait & Co., at Long and Jefferson avenues, Columbus, O., has taken over the distribution of the Nash line for central Ohio.

Spring City Auto Co., Waukesha, Wis., has let contracts for the erection of a one-story brick and steel garage and service addition, 65x190 ft., costing about \$35,000 with equipment.

The Service Chevrolet Co., Youngstown, O., has been chartered with a capital of \$50,000 to operate a sales agency and service station.

The Cincinnati Cadillac Sales Co. has been incorporated with a capital of \$100,000 by W. A. Geohagen, Roy Manogu, Henry M. Bruestle, E. Rinehart and L. J. Williamson.

The new L. O. Naylor Co., 43-53 W. Fourth South street, Salt Lake City, Utah, opened its establishment a few days ago. The celebration included a general invitation to the women of the community to phone for a car to take them to the showrooms without any obligation. There was much music and flowers were distributed freely to the lady visitors. The company is general distributor for the Nash Car in Utah, Idaho, southern Oregon, eastern Nevada and western Wyoming.

Large Increase in A. E. S. A. Membership to Show in 1923

Plans for Annual Convention Name Date as Jan. 29 at Congress in Chicago

DETROIT, Dec. 1.—The directory of the Automotive Electric Service Association for 1923 will show a large increase in members over the total for this year, and in this connection Secretary D. W. Burke is sending out a letter to prospective members urging them to file their applications in time to be listed in the new booklet.

Because of the lateness of the season, the association will not assess dues for 1922 on members joining now, but suggests that they approximate their business for 1922, and in making application request that the dues apply for 1923. Dues are assessed according to volume of business, the five classes being under \$25,000, \$10; \$25,000 to \$50,000, \$20; \$50,000 and less than \$100,000, \$30; \$100,000 and less than \$250,000, \$50; \$250,000 and over, \$75. Initiation fees will be suspended until Jan. 1.

Convention Plans Settled

Plans for the annual convention of the association have determined the Congress hotel, Chicago, Florentine room, as the site and Jan. 29, 30 and 31 as the dates. The board of governors will meet on the opening day, and the general sessions will be on the two latter days. A joint session with the Automobile Electrical Association, the manufacturers' body, will be held on the closing afternoon. All electrical equipment dealers are invited to attend the open sessions. Over 200 members will attend the closed sessions.

A questionnaire to car dealers is now being circulated by the association to determine the effectiveness of the service that the equipment dealers have been rendering and requesting information for improvement. It will also serve to show manufacturers how equipment dealers and car dealers are cooperating and afford opportunities to put the service on the best basis from the owner viewpoint.

CLUBS DO GOOD WORK

COLUMBUS, O., Dec. 2.—Due to the aggressiveness of automobile clubs, illegal speed traps in Ohio have been greatly reduced in number. The Erie County Automobile Club broke up the Vermillion trap that gave a great deal of annoyance to law-abiding motorists.

Another accomplishment of this club is that through arrangement completed with Director Herrick by Fred Volmer, secretary, the dangerous curve on the Sandusky-Toledo road between Sandusky and Castalia, known as Barchers' Corner, is to be eliminated. Concrete will be placed on the inside of the bend. This is a good example of team work.

CONCERNING MEN YOU KNOW

S. I. Kirby, for many years a district sales representative for the Buick Motor Car Co., and later assistant manager of the Buick Philadelphia branch, is now district sales manager for the Peerless Eight in New Jersey.

Thomas J. Hay, president of the Chicago Automobile Trade Association, recently delivered an address on the magnitude of the automobile industry for broadcasting over the KYW radio station.

Joseph Lanus, automobile dealer at 4636 West Madison street, Chicago, was shot and killed in his garage one evening last week. The police have no clue as to the identity of the murderer.

T. G. Andrews, formerly connected with the Hupmobile agency in Detroit, has joined the sales department of the Hendee Mfg. Co., covering the state of Pennsylvania for Indian motor-cycles.

C. B. Franklin, product engineer of the Hendee Mfg. Co., manufacturers of Indian motorcycles, is on an extended business trip through the middle west and Pacific Coast. He is visiting dealers en route for suggestions for future engineering development of this product.

Stephens Bourne has resigned as assistant to the president of the Wills-St. Claire Co. of Pennsylvania to join the advertising agency of Thomas F. Logan, Inc., New York, Chicago and Washington, as director of merchandising.

Charles E. Stephenson, treasurer of the Barley Motor Car Co., died last week at his home in Kalamazoo after a short illness. He was 47 years old. He was engaged in business in Kansas City, Kan., and at Streator, Ill., before coming to Michigan.

F. W. A. Vesper, president of the Vesper-Buick Auto Co. of St. Louis, has been elected for a second term as president of the St. Louis Chamber of Commerce. Vesper's work with the Chamber of Commerce for the past year has been predicated upon the policy he announced at the time of his election for the first term, namely, "Selling St. Louis to St. Louisans."

F. A. Detwiler, for six years with the Maxwell-

Chalmers Co., has been appointed district manager for the Atlanta, Ga., territory of the Anderson Motor Co., Rock Hill, S. C.

Ralph D. Mock has become general manager of the Bessemer Motor Truck Co., which has been merged with the American Motors Corp., under the name of Bessemer-American Motors Corp. He was formerly vice-president of the Hydraulic Steel Co. of Cleveland, O.

F. W. Gargett has been named assistant to the president of the Indiana Truck Corp. His duties will be looking after the branches and the subsidiaries of the company. Gargett was formerly with the Transport Truck Co. as factory manager.

F. M. Leeston Smith, who has been with the Studebaker in Portland almost continuously for ten years, has been named sales manager for the John K. Leander Co., Studebaker dealer in Portland, Ore.

Edward W. Burnshaw, Jr., formerly general manager and treasurer of the Girard Automobile Co., Philadelphia distributor of Peerless cars, and more recently connected with the Sweeten Automobile Co., Ford and Lincoln dealer, has been appointed vice president and general manager of the Universal Motor Agency, 3427 Chestnut street, Ford and Lincoln agency, Philadelphia.

Announcement of the appointment of Bruce E. Adams as manager of the Chicago branch of Rolls-Royce, 900 Michigan avenue, succeeding Howard S. Hamilton, resigned, is made by S. deb. Keim, general sales manager.

Ralph Brooks has joined the Anderson Motor Co. of Rock Hill, S. C., as district manager for Florida and southeast Georgia with headquarters at 849 Third avenue, Petersburg, Fla.

D. C. Black, president of the Atlanta Automobile Association, and one of the Atlanta Buick dealers, has finished construction of a new and permanent home for his Buick agency in Atlanta at Whitehall street and Stewart avenue. Black, who is an engineering graduate of Georgia School of Technology, designed the building himself, which provides 18,000 square feet of floor space, and includes a large service station.

Truck Prices Likely to Show Increase for 1923

DETROIT, Dec. 1—Prices on trucks, especially those in the specialized unit field, will show increases in prices as new models for the year 1923 are announced. Already two of the most important of the nationally distributing manufacturers have announced intentions to revise upward prices now effective, and it is unquestioned that their lead will be followed by the smaller companies.

Truck price increases are due primarily to increased prices by the unit part makers, some of these approximating 12 per cent over prices effective over most of the last year, and are also due to the fact that trucks were underpriced for the most of the year to move heavy inventories. Now that the inventories are about gone, the industry is getting back on a sound price basis and will do business from his time on to make money.

JOIN IN GOODYEAR SUIT

Akron, O., Nov. 30—Francis Seiberling and R. L. Robinson of Akron, directors of the Goodyear Tire & Rubber Co., and party defendants to the four actions filed in the Akron common pleas courts on Aug. 8 by Mrs. Laura L. T. Weiss of Cleveland, a Goodyear stockholder, in which she attacks the legality of the entire \$85,000,000 refinancing and reorganization program of the Goodyear company, have filed answers to one of Mrs.

Weiss' petitions in which they state they believe the allegations in her petition to be true. The two Goodyear officials in their answers join in with the prayer of Mrs. Weiss in her charges against the new Goodyear management, and petition the court to grant stockholders of the company the relief which they demand.

BARLOW TO INCORPORATE

Cleveland, Nov. 30—Application for articles of incorporation for the Barlow Steam Engineering Co. has been filed with the secretary of state at Columbus, by Lester E. Barlow, inventor of a steam engine for motor cars.

Barlow has interested the Cleveland Chamber of Commerce in his proposition and it is said the chamber will seek to secure the backing of bankers and capitalists in the Barlow device and will endeavor to secure a local plant for the new enterprise. It is Barlow's intention to organize a company to build steam-driven motor buses, and later to incorporate another company to manufacture passenger cars.

TRUCK SALES DROP

COLUMBUS, O., Dec. 2.—A slight falling off in demand for trucks of all kinds is reported in Columbus and central Ohio, but this is believed to be only seasonal. Indications point to an opening of business immediately after the first of the year. Under the stress of circumstances many business concerns have permitted their motor truck equipment to deteriorate to a large extent.

Texas Dealers Still Selling Large Number of Automobiles

Farmers Experience Good Season With Prospects Good for Next Crop

DALLAS, Tex., Dec. 2—While the bulk of the crops have been marketed, the farmers of Texas are now preparing for another bumper production and the peak of the automobile buying does not appear to have been passed. Retailers, despite the approach of winter and the inclement weather, have not noticed any lull in the buying of cars, tires and accessories. In fact, November sales were about the same as those of October, and October was one of the banner months of the year. The indications are that the various automobile shows over Texas this fall are yet stimulating business, and that aggressive salesmanship, coupled with better cars at lower prices than ever heard of, is preventing any loss in the number of sales on the part of the retailers.

In Dallas the number of retail sales has been around 100 a day and the distributors have been placing cars with their agents about as rapidly as they could obtain them.

The Fort Worth retailers report that the sales for November were about equal to those of October and that indications are the December sales will be as great.

Houston dealers reported increased sales for November. That was probably due to the fact that the Houston Automobile show, extending over a dozen days, was held during the month. Sales at Galveston were about what they were in October. At San Antonio the sales were holding up, the retailers reported, while at Waco the sales in November showed an increase over those of October.

The tire dealers and the accessory men had better business in November than they had in October. The garagemen reported increased business. Instead of storing cars for the winter, owners are having their cars and commercial vehicles put in top order.

Retailers report sales are still good in the rural districts. Many of these sales are on the partial payment plan. But the retailers have worked out an arrangement with banks and regular licensed surety companies for handling short time notes given as part payment for automobiles and are not having any large amount of money tied up in cars.

Retailers looking into the next year say they will have to have larger productions and quicker deliveries to supply the demands in this section.

DUNLOP MAY RESUME

BUFFALO, Dec. 1—Information that comes from a source of apparently unquestionable authority indicates that the \$25,000,000 plant of the Dunlop Tire Co., in the River Road, is to be placed in operation early in 1923.

BUSINESS NOTES

Waters-Sparks Co. has been organized and incorporated at Macon Ga., as an automotive distributing agency, with \$10,000 capital. W. T. Waters, W. B. Sparks, Jr., and H. A. Lorick, all of Macon, are the incorporators.

The Pennington Motor Co. has been opened at Wetumpka, Ala. This concern will handle Overland and Essex cars.

The Fulton Co. of Milwaukee, manufacturer and distributor of automotive equipment, entertained its branch managers and field force at a banquet following a sales conference at the factory at the conclusion of the Automotive Equipment convention in Chicago. The meeting was conducted by S. M. Fulton, president and general manager, and L. M. Fidler, secretary and treasurer.

To accommodate a larger volume of business and provide for increased capacity, the Motor Castings Co. of Milwaukee has increased its capital stock from \$10,000 to \$20,000.

A charter has been granted to the Automobile Gasoline Gauge Co. of Eau Claire, Wis., incorporated with \$20,000 capital by C. E. Knoblauch, E. J. Kuchi and V. A. Stoltz, to manufacture automotive equipment specialties.

A line of motor truck bodies, including special types with mechanical hoists, will be manufactured by the Giljack Auto Truck Body Co., which has been incorporated at Jackson, Wis., by W. L. Gilbert, E. A. Prahl, W. H. Froehlich and others.

"Fix-It-Yourself," Say Some Dealers to Owners

PORLAND, Ore., Dec. 2—The liking of the average motorist to tinker around his cars and make small repairs himself, when he has time and the tools and equipment are handy, has been seized upon by a Portland garageman for the establishment of a new department which promises to become highly popular. It is known as the "Fix-It-Yourself" department. A. C. Simson, manager of the E. & S. Garage, First and Harrison Street, Portland, has just put the idea into practice, setting aside one of the cleanest and most conveniently arranged portions of his garage building for the department.

The department is designed to serve both those who like to do small jobs on their cars but do not have the tools or the work room, and those who may discover repairs upon their car to be done while on a trip downtown and when it is easier to drive the car into the garage than to take it home to the amateur shop. When the driver comes into the garage his car is taken to a convenient point, depending upon what the work to be done consists of, and the necessary tools are supplied him. Advice and suggestions are also furnished as to carrying out the work. When the job is completed the driver returns the tools and drives his car away, paying a nominal rental for the tools and for the garage space, depending upon the length of time which the operation took.

FT. WORTH CHEVROLET TO BE SOLD

FORT WORTH, Tex., Dec. 1—The Fort Worth assembly plant of the Chevrolet Motor Co., one of the largest plants of this kind in the Southwest, is to be disposed of by the General Motors Corporation, according to advices received by local officials. The announcement of the

Lorenz Kohl, Marshfield, Wis., painting and interior decorator, has started construction work on a new building, 40x75 ft., to be equipped as an exclusive painting and enameling shop for motor vehicles.

The Low Gasoline Alarm Co. has been incorporated at Cincinnati to manufacture a gas alarm device.

The Van Metal Wheel Co., 1408 Market street, San Francisco, has been organized to handle dealers' sales of the Van hollow spoke malleable and aluminum wheels in California. The new company is controlled by interests operating the Lambert tire agency at the same address.

Taylor, Armitage & Eagles Co. and Fred Stearne Co., Inc., both of New York City, bought the plant of the Batavia Rubber Co., at Batavia, N. Y., which fell into the hands of receivers a few months ago, and was sold at public auction. The plant itself was sold for \$5,000 and the personal property was sold for \$10,000. Three mortgages bring the purchase price to \$110,000, as the buyers were creditors of the concern.

Managers of the district offices in the United States and Canada of the Wayne Tank & Pump Co. held a three-day conference at the home office in Fort Wayne, Ind., recently. The new office building of the company is now completed and the various departments are being transferred to the building.

intention to dispose of the plant here merely said "the manufacturing plans of the company have been changed and for good reasons the assembly plant will be disposed of."

RICKENBACKER ADDS TO PLANT

DETROIT, Nov. 30—The Rickenbacker Motor Co. has taken over the former plant of the Detroit Shell Co., where shells and ammunition were made during the war. The building adjoins the Rickenbacker property. In it are 20 concrete and steel abutments, with a solid base 20 feet in the ground and rising from the floor level to four feet in height, which must be removed before the Rickenbacker company can use the building. It will be at least two months before the building will be ready for use. It will be connected with the present Rickenbacker factory by a 60 foot archway, giving the organization approximately 500,000 sq. ft. of floor space. The new addition will house a continuation of the assembly line and will be the finishing end of the production line.

Other building activity at the Rickenbacker factory, which soon starts its second year of production, includes an addition to the office building, an enlarged experimental department, the installation of a complete factory service station for Rickenbacker tourists and the construction of an executive's garage.

MOON HAS LARGE ORDERS

ST. LOUIS, Nov. 30—The exhibition of the new Moon 6-40 sport phaeton to the company's distributors here resulted in unexpectedly large orders for this model. The company has had to double its proposed schedule for this particular model. The New York distributor ordered 28 of these cars shipped by express, and two carloads have gone to Newark, N. J., by express. As this is an open car, the factory officials are somewhat surprised at the large sale at this season.

Illinois Farmers' "Strike" Ends; Buying of Cars Begins

Many Truck and Tractor Agencies Are Discontinued in Lull But Times Change

BLOOMINGTON, Ill., Dec. 1—The farmers' "strike" in Illinois is over. The men who till the soil are commencing to buy. Automotive dealers are feeling the effect of returned prosperity among the agriculturists by sales not only of automobiles but tractors and trucks. Corn is now quoted at 60 cents a bushel and the predictions are that it will soon reach 75 cents. A year ago the figure was down to 35, far below the cost of production.

The truck and tractor men for the past two years have been marking time. Dozens of tractor agencies were dropped and the truck deals fell off nearly as much. The tide has now turned. The farmers of this county alone (McLean), raising more than 6,000,000 bushels of corn, are \$1,500,000 better off than they were at this time a year ago.

Many orders will be placed this winter for spring delivery. This is assured by the inquiries that are being reported in many sections of this territory. Salesmen for tractor firms are being recalled and agencies are being reopened. The new year will find a very much different situation than was the case at this time last year. Tractor factories are planning to increase their forces and in many other ways will the nation profit by the farmers' increased wealth.

BILL TO INCREASE TAX

SALT LAKE CITY, Utah, Dec. 2—A bill will be introduced in the new legislature, which meets in January, to increase the tax on automobiles. The increased revenue will be used in connection with the plan to raise more money for highway purposes. Automobiles in the state are paying on an average of \$15 for license and \$8 for ad-valorem under the present system. The average consumption of gasoline per car is said to be 400 gallons. The total amount of gasoline consumed in the state annually is estimated at 25,000,000 gallons.

BEECROFT, SHERMAN TO TALK

CLEVELAND, Dec. 1—David M. Beecroft, of the Class Journal Co., and Ray W. Sherman, of Chicago, director of the Automotive Equipment Association, will be speakers at trade rallies to be held here in connection with the automobile show in the public auditorium Jan. 20 to 27.

SHOW EXHIBITORS' LIST

NEW YORK, Dec. 1—A revised list of national show exhibitors reports that 83 manufacturers will show cars at New York. Two have cancelled their spaces—the Standard Steel Car Co. and the Templar Motors Co. Several additions have been made to the accessory list.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

Rebuilding Marmon for Racing

Q—We are building a racing car using a Marmon 34-1919 engine and Mercer running gear with 3 to 1 gear ratio. How can we increase the speed of the Marmon engine?

1—When suggesting methods to increase the speed of the Marmon engine we can only generalize and would suggest that you lighten all reciprocating parts, especially the pistons; also that the compression be increased and, if possible, the valve lift increased, or at least the valve timing angle should be changed. Of course, the thing to strive for is to increase the revolutions, or if this cannot be done, to increase the power without any increase in the revolutions.

The effect of any of the above changes cannot be forecast with any accuracy. To get the utmost performance from the engine after you have made these changes it would be necessary to know the characteristics of the engine after having put it on a dynamometer test stand. Generally speaking, however, the changes outlined will tend to increase the revolutions and probably slightly increase the maximum power. When this is done we would advise that you do considerable experimenting to find out the most suitable rear axle gear ratio, as increasing the engine revolutions will not necessarily mean that the gear ratio can be lowered.

2—What ignition do you think would be best?

2—The Marmon cylinders are equipped to take only a single spark plug and, assuming that all other things are equal, especially the quality of the spark, we believe that probably less mechanical trouble will be given by the battery system, because of the fact that it need not be operated at the same speed as would be necessary using a conventional two-spark magneto. A two-spark magneto will revolve at $1\frac{1}{2}$ times crankshaft speed and, if the engine is revised to such an extent that the speed will be over 3400 r.p.m., will mean that the magneto will have to revolve approximately 4100 r.p.m.

We do not mean by this statement that it will be impossible to secure a magneto that will withstand such revolutions. If you intend to install battery ignition, a magneto replacement type of battery distributor will be required, because of the fact that probably different gears will be required in order to adapt a battery system to the present magneto drive gear, which is of a size giving a $1\frac{1}{2}$ ratio between crankshaft and magneto.

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

Readers' names will not be published with articles, if a request to this effect is received with the letter. The name and address should be given, however, so that we can send a copy of our answer direct by letter. This saves waiting for the answer to be published, which sometimes occurs several weeks later, depending upon the space available.

Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

3—What carburetor would you use?

3—We would advise that you seek this advice from the Marmon company and would also add that it is contrary to the policy of this magazine to recommend any certain make of carburetor or other equipment.

4—What mileage should we expect to get as it is?—J. Wesley Williams, Tulsa, Okla.

4—The mileage which you will derive from a gallon of fuel will depend upon several factors, the greatest of which is the actual brake hp. of the engine. Regardless of the gear ratio used, the amount of gas consumed will bear direct relation to the amount of power delivered and with an increase in power you can expect a corresponding decrease in gasoline mileage, that is, the consumption will be increased. Offhand, wish to state that 10 to 12 miles per gallon would be a good average.

This Generator Will Not Charge

Q—We have a Delco generator, on an Oakland car, that is giving us trouble. The armature was recently rewound and the generator worked for a short time after being put on the car. Now, however, it will not charge and when the generator is off of the car and connected to a battery it runs in the opposite direction from the way it does on the car. When the generator is on the car and the live terminal is grounded to the frame of the car through an ammeter it shows an output of 10 amperes, but when connected to a battery it discharges. We have tried another battery and the results are no better. What is likely to be the cause of this trouble?—O. L. Bradford, Hinsboro, Ill.

Our first guess would be that the shunt field is opened or that the third brush is not touching the commutator. To test this condition we would suggest first lifting the third brush so that the shunt field will be opened. Then hold the armature so that it cannot turn and connect a battery to the generator, having an ammeter in series. You should now get a discharge current of 15 to 20 amperes through the armature. While observing this reading on the ammeter you can drop the third brush back onto the commutator and the reading should increase slightly, showing that there is a connection through the shunt field.

If you make sure in this way that you have both armature and field circuit and the machine still runs backward, it shows that the field connections are reversed and the one which goes to the third brush should go to the main brush and the one which is now on the main brush should go to the third brush. This information is based on the fact that a third brush generator should always run as a motor in the same direction that you are going to drive it as a generator.

If, when running as a motor, it draws four or five amperes and the indication on the ammeter is steady, the armature is probably O. K., but if it draws 10 or 15 amperes running as a motor and the needle on the ammeter jumps back and forth, the armature is probably shorted or grounded. The test made by using the ammeter to make a ground connection does not mean very much, as the armature can probably send 10 amperes through itself without any field excitation, generating this current from residual magnetism only. This is due to the fact that practically no voltage is required, as you have very nearly a short-circuit or circuit of very low resistance.

Another possibility is that the belt or chain drive, whichever it happens to be on the car in question, is slipping.

This Garage Requires Main Street Entrance

Q—We are planning a new garage and would like some suggestions from you. You, no doubt, have given much information to builders and may have several plans of garages built by Motor Age readers. We have taken your magazine for many years and have studied the garage planning section very carefully, nevertheless, wish you would help us out if possible.

We have two corner lots 55 x 95 ft. each or 110 ft. frontage and 95 ft. on side street. We do not wish the car entrance from the front. Our plans thus far are for a building 72 x 95 ft. The following are the departments we desire to get into this building: Show room for at least 3 cars, stock room (Chevrolet parts and surplus stock), office, repair shop large enough for 4 cars at least, storage space for about 15 cars.

Any information you can give will be greatly appreciated.—Anderson Motor Co., Norway, Michigan.

When you specified a building 72 by 95 ft. with entrance from the side, you probably were not aware of the difficulties you were laying in our way. Thus far we have been unable to make a good layout this way and we have tried every conceivable combination. If you had 100 ft. or more of depth, the problem would not be so hard. Then you could lay off 50 ft. for a garage and 25 ft. or a little more for shop and still have usable width for the showroom but with only 95 ft. available, all of the departments would be narrowed to the limit.

No doubt, you know that we are usually averse to garage entrances on the main street when the side street is available, but here the conditions upset our desires and we think the garage entrance rightfully belongs in front.

In our layout we have used the full frontage and enough depth to equal the area you suggest, thus keeping the cost to your figures. This layout has the added advantage of being easily enlarged to fill the whole lot with very few changes. The garage may be extended back by the addition of two trusses and a rear wall. If you need more service facilities the shop may be extended back either separately or together with the garage.

There is room for five cars in the shop

A READER'S EXPERIENCE

Referring to the very pronounced knock in a Ford engine described by Hueneme Garage of Hueneme, Calif., Palmer's Garage, of Milan, Ill., have the following to say:

In regard to Hueneme Garage at Hueneme, Calif., trouble with a 1922 Ford having a peculiar noise on advanced spark, they describe it as a clattering noise, but I would say it is more of a slap if it is the same as I have experienced for the last two or three years. This occurred if I installed a good grade of step-cut ring in the top grooves of the pistons of most any model of Ford. My experience has been that it is more pronounced in cylinder number 2 or 3, but may show up in any cylinder.

The only reason I can give for it being more pronounced in those two cylinders is on account of the slope of the intake

Architectural Service

IN giving architectural advice, MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

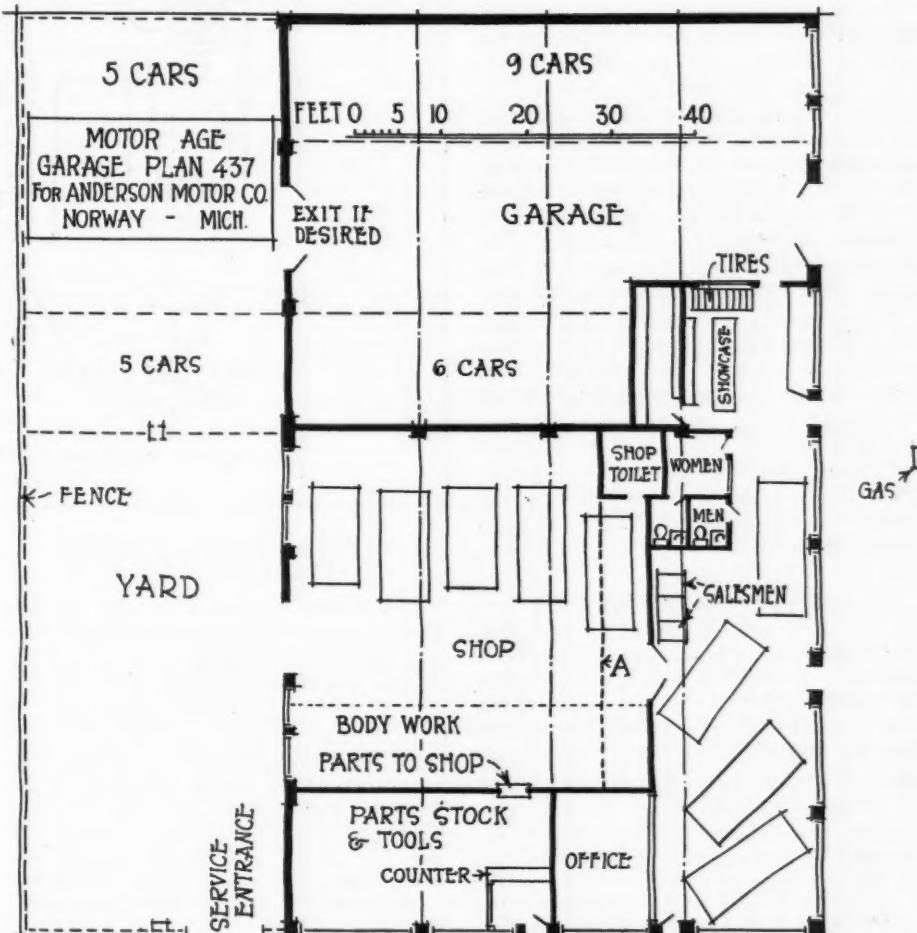
What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

How much of an accessory department is anticipated.



besides one in body work, but it might be desirable to enlarge the show room to A and limit the shop to 4 cars. Finished cars might be stored in the yard in good weather or taken through the yard into the garage.

By building a good fence around the

yard it could be made use of in many ways, both for service and overflow or lower priced storage. The service entrance perhaps is not so desirable through the yard but will save considerable floor space which is badly needed for stockroom.

manifold numbers 2 and 3, giving a stronger charge of gas than 1 and 4.

On every Ford engine the pistons come up to a certain distance above the top of the cylinder, exposing the top edge of the ring and the explosion of the gas on advanced spark drives the ends of the rings away from cylinder walls and as the pistons travel down possibly $\frac{1}{16}$ in., the ring snaps out against the cylinder wall, making this noise. I find if the rings are turned away from the spark plug or on the opposite side they are not so apt to make this noise. Also on some Fords the pistons come up a trifle higher than on others and where you find one on which the ring is exposed as much as $1/32$ of an in. you can depend it will make same noise as with step-cut rings.

When you put Ford rings in you don't have the trouble, not on account of it being a superior design of ring, but because the Ford ring is an eccentric ring having much more wall pressure when

new, it being so stiff it does not drive back from the wall. Another thing, it does not have the life to it that a good step-cut does, it is slower in its action and if it does drive back from the wall it doesn't spring out quickly enough to make the noise.

My remedy for this trouble, where customers want step-cut rings and I prefer to use a good ring that will not break down from the heat, is to install Gill rings in the top grooves of the pistons, as from their construction at the joint they can't make this noise; at least I have never had a failure so far. I have good success by using an Apex inner ring under the ordinary step-cut or in some cases it may be necessary to use an oil control ring to keep the oil down. In a piston that pumps oil I use a Super oil ring sometimes with an inner ring and often without, and never a sign of this noise. I always place all ring gaps on opposite side of cylinder from plugs and valves.—R. W. Palmer.

Oil Pump Lacks Pressure

Q—We received your answer in regard to the oil pump trouble on an Oakland Six. In some way we made a mistake in the year and model. It is a 1917 model 34 instead of a 1919. The pump is of the plunger type mounted on the push rod assembly and we are unable to make it give enough pressure to give reliable lubrication. Would like to have some remedy for this condition.—J. N. Neal & Sons, Greene, Iowa.

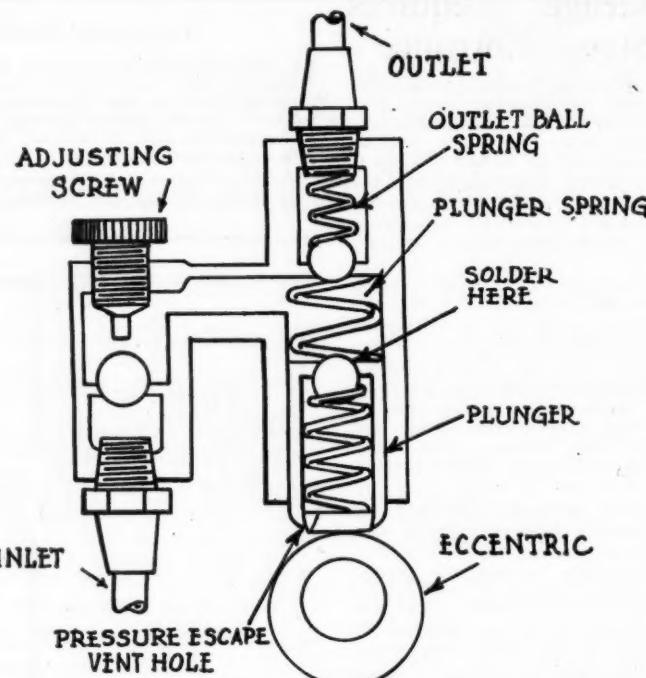
In the sketch shown we have given a general idea of the construction of the plunger pump used on 1917 Oakland cars. The construction may not be exactly as shown but the principles are. On the camshaft is an eccentric which operates the plunger, making it move in an upward direction, and when the eccentric permits, a heavy spring above the plunger pushes it down again. The plunger will accordingly move up and down all the time the engine is running.

At the left is the inlet through which oil is drawn up from the bottom of the crankcase. When the plunger goes down it will tend to produce a vacuum in the oil pump and will lift the ball check above the inlet and allow oil to be drawn into the body of the pump. Then when the eccentric causes the plunger to rise again it will tend to compress the oil in the pump and will close the ball at the inlet.

The ball just below the outlet, however, will now be forced off of its seat and oil will be sent out from the upper connections. From this point it goes to pans or troughs into which the connecting rods dip and this supplies lubrication for the engine. The outlet also connects to the oil gage on the cowl board of the car. The adjusting screw at the left has some effect on the amount of oil pumped by more or less limiting the rise of the ball check.

Referring now to the plunger, it will be seen that it contains a spring and another ball, but the spring is supposed to be stiff enough to normally hold the ball, so that there is no leakage of oil through the plunger. The design is intended to take care of excessively high pressure, which is supposed to push the ball down and allow the excess oil to leak out of the pressure escape vent hole.

Trouble with pumps of this type which fail to pump sufficient oil is likely to be due to weakening of the spring inside of the plunger. This allows a considerable quantity of oil to leak away instead of being forced from the outlet. The remedy often employed is to solder the ball securely to the upper portion of the plunger and eliminate the pressure escape path entirely. It would, of course, also be well to see that the plunger return spring has sufficient strength to push the plunger down when the eccentric starts to move down. It would also be advisable to inspect the other ball checks and see that they are working properly.



TRACTOR STOPS WITHOUT APPARENT CAUSE

Q—We have a Sampson tractor that has been giving trouble by stopping without apparent cause. It runs for a few minutes and then will stop as if it was out of gas but we have examined the gas line, carburetor and manifold closely and have found no trouble. It always has gas in the carburetor when the engine is stopping. The magneto has a good hot spark but, thinking the trouble might be in the magneto, we tried a new one with no better results. Sometimes when the engine is stopping if we will choke it, it will run and at other times will not. We have turned the gas off when the tractor is stopping and always find gas in carburetor at proper level.

Some of the best mechanics in the country have worked on this tractor with no results. Will say that we put the gas in tank under pressure so as to be sure of feeding it, also tried new carburetor with no better results. It runs well while running but will gradually stop.

Having tried every possible plan and also plans suggested by other mechanics, an expert was called from the factory and before the expert arrived, a connecting rod broke and went through the crankcase. The expert came out and examined the tractor as best he could but said he could see no reason why it should not run. The tractor was in good shape, engine had good compression and would always start. It is either a 1918 or 1919 model. We examined the governor and found it working properly. We removed water air strainer but still had no better results. We would like suggestions on overcoming this trouble.—W. E. Hollenbeck, Lentner, Mo.

You have certainly done nearly everything possible to locate trouble of this kind. It occurs to us as a possibility that the pistons may have been replaced and are a little too large so that they gradually freeze as the engine runs. We would accordingly suggest that the instant the engine stops, you try cranking it and see if there is any appreciable drag.

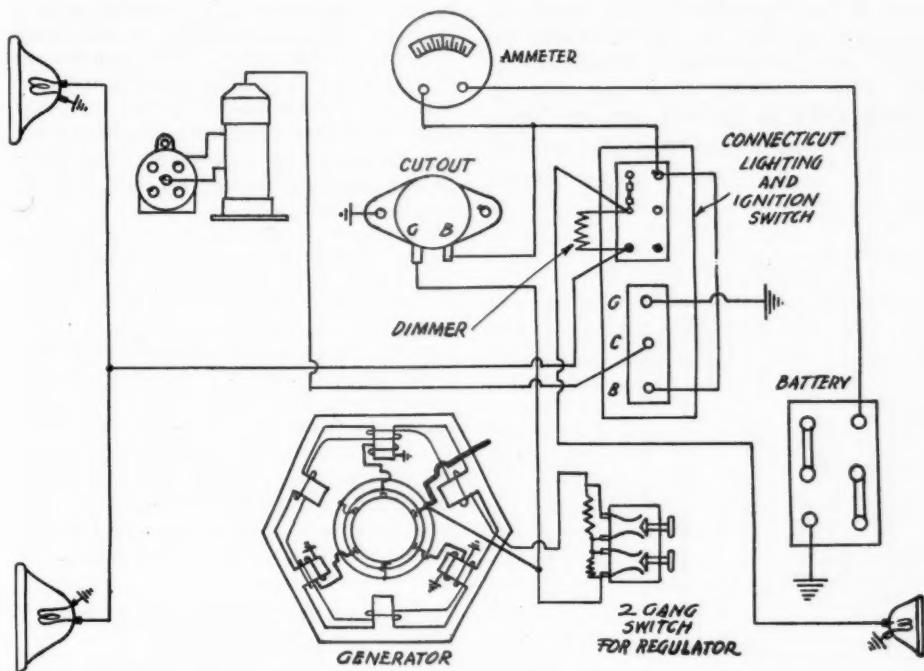
Another thing that occurs to us is the possibility of an intermittent leak in the intake manifold, perhaps at some flange where the trouble does not occur until a certain vibrating condition of the engine takes place.

Still another possibility is a sticking valve which would disturb the mixture and prevent the intake manifold from supplying combustible gas to the cylinders. We would suggest trouble in the gas line and a possible air pocket at some high point in a bend in the gas line except that the connection from the tank down to the carburetor is very short and direct and under these circumstances this does not seem a likely cause for the trouble. Another possibility does present itself, however, in case the gasoline line is allowed to touch the exhaust manifold, which might have the effect of evaporating gasoline in the line and creating a pressure which would prevent fuel flowing to the carburetor.

While you have checked the ignition by trying another magneto we would suggest that you do it another way. When you get the engine so that it will stop occasionally try removing one wire from the spark plugs and observing the spark. Then as the engine stops, watch the sparks very carefully and see if they jump up to the very last gasp that the engine gives. If the sparks continue up to the last revolution the magneto is doing its duty but it is possible you may find that the ignition system is at fault. Water in the gasoline is another possibility and we would suggest frequent draining of the sediment bulbs.

This case is very interesting and a report would be appreciated as to the results obtained.

Wiring 1917 Maxwell for Generating Only



Q—We would like to have chart showing the wiring necessary on a 1917 Maxwell to make it suitable for generating only. We will discard the starting feature and use the hand crank. We also wish to use a four-button Connecticut switch, ammeter and relay. This car has Atwater-Kent ignition and the old wiring has been destroyed or lost.—Rudolph H. Meyer, Elk City, Kans.

We assume that you have also discarded the voltage regulator and cut-out together with the switch which comes on the cowl board and have made a wiring diagram accordingly.

It is necessary to have some sort of a regulating device and we have accordingly shown a separate two gang lighting switch with iron wire resistance coils mounted on the back. The object of this is to have resistance which can be thrown in series with the field windings at medium and high speeds, so that the battery will not be overcharged.

Referring to the diagram it will be seen that connection from the brushes out through this regulating switch is completed back to the field windings

when the buttons are pushed in, as this shorts out the resistance coil and does not add any extra resistance. As the car speed increases and the ammeter indication becomes too great the lower button can be pulled out which will throw a certain amount of resistance into the circuits. Then when the current again increases too much the lower button can be pushed in and the upper one pulled out and at extremely high speed both buttons can be pulled out. If the regulation is not sufficient with both buttons out it will be necessary to try coils made with smaller wire or else with a greater length of wire.

The length of wire in the upper coil should be twice that in the lower coil for best regulation and greatest variety of possible regulating positions. It will also be necessary to use a dimming resistance of iron or German silver wire on the back of the lighting switch as shown on the diagram, this resistance being labeled dimmer. This should be of German silver wire if such is available although iron wire can be used.

TIMING MODEL 45, 1922 BUICK

Q—Advise how to time a Model 45 1922 Buick, six cylinder car.—John Virobek, Roberts & Virobek, West Frankfort, Ill.

1—Place the spark lever on the steering wheel in the fully retarded position. Turn flywheel to the 7-degree mark which is approximately 1 in after dead center, with the number 1 cylinder on the firing stroke. Remove the distributor cap and distributor brush. Loosen the timing adjustment screw in the center of the breaker cam. Turn the cam so that the distributor button will be in position under number 1 high tension ter-

minal when the distributor head is properly located.

Locate the breaker cam carefully in this position, so that when the backlash in the distributor gears is rocked forward the contacts will be opened and when the backlash in the gears is rocked backward the contacts will just close. The distributor shaft turns clockwise when viewed from the top. Tighten the adjusting screw securely and replace the rotor and distributor head. The cylinders fire in the following order: 1, 4, 2, 6, 3, 5.

ENGINE MISSES WHEN CLIMBING HILLS

Q—We are having considerable trouble with a Moon 6-66, 1918. This car has a Continental engine, model 7N, engine No. 25792, Delco ignition, Zenith carburetor with choke No. 22, main jet No. 105, compensator 115, idling well No. 60, needle valve seat No. 38. The engine works fine on average driving but, when making a run for a hill, when nearing the top, it will commence to miss and fire back in the carburetor.

Carbon has been burned out, valves ground, gasoline pipes cleaned and all connections tightened. Timer has been cleaned, and points filed and adjusted and there has also been installed a new top in the vacuum tank. This machine has been rebuilt into an ambulance weighing approximately 3800 pounds. We would appreciate an early answer as this machine is often used on hospital trips of 30 miles or more.—W. Gardner, Flushing, Ohio.

Before suggesting a cure, we would advise that you determine the cause of the missing. A simple test can be made by driving the car along a level road and applying the emergency brake to such an extent that a decided load is put on the engine, which in this case would be the equivalent of the pull imparted by the gradient of the hill. If the engine does not miss with brake applied, it would indicate that the trouble lies somewhere in the fuel system, because the angle attitude of the car when on a hill would affect mostly the flow of the fuel to the carburetor. The position of the vacuum tank and the height of the fuel in the carburetor bowl should be noted and examination made to see if fuel is present in the bowl when the car is in a hill climbing position in relation to the floor.

If the engine does miss, examine the setting of the spark plug points and the valve tappets. The tappets should have not less than .003 clearance. The Delco distributor shaft bearing should be examined for side play, which should not exceed .010, and the distributor bakelite cover examined for possible cracks. As these three items are the most likely items that will affect the performance of this car we shall await your answer regarding whether the car will or will not miss on a level road when pulling.

The recommended internal equipment for the Zenith carburetor for 7N Continental is a No. 22 choke, No. 105 main jet, No. 110 compensator, No. 60 idling well. It will be noted in checking this recommendation against equipment at present installed in your engine, that you have a compensator five points larger than the recommended compensator. This will cause no great variation in the performance of the carburetor and is not at all responsible for any missing or back-firing, to which the engine is subject. Perhaps slightly better acceleration would be derived if the compensator was changed to 110, but it would not affect the performance of the engine on the hill.

Electrical Information for 1916 Grant

Q—We are having considerable trouble with the wiring on a 1916 Grant Six, equipped with Atwater-Kent ignition and single unit Allis-Chalmers starter. At one position of the polarity changing ignition switch, all of the current goes through the ammeter and at the other position,

sition of the polarity switch, this accidental ground is connected back to the side of the polarity switch which is grounded anyway, so that no harm results. Another possibility is that one of the wires running from the polarity switch down to the coil box and interrupter is grounded, by being touched

This can be checked by removing wires from the spark plugs to see if a good spark is obtained while cranking with a starter. Another possibility is that there are air leaks, which give trouble in starting, and it is also possible that the low speed adjustment is not properly set. As a last possibility the float indicator should be inspected. The level of the gasoline should be half way up the indicator glass.

3—Have you any suggestions to offer as to making a heating resistance for the intake manifold, which could operate in the garage from 110 volts A. C.?—Reuben Kuempel, Guttenberg, Iowa.

3—We have at present no design of a resistance unit to offer for this purpose and, if you still have trouble starting after checking up as above indicated, would suggest using one of the primers on the market, which incorporate an electrically operated heating coil. Devices of this kind were described in the winter service number of MOTOR AGE.

THIS ENGINE MISSES ONLY WHILE ACCELERATING

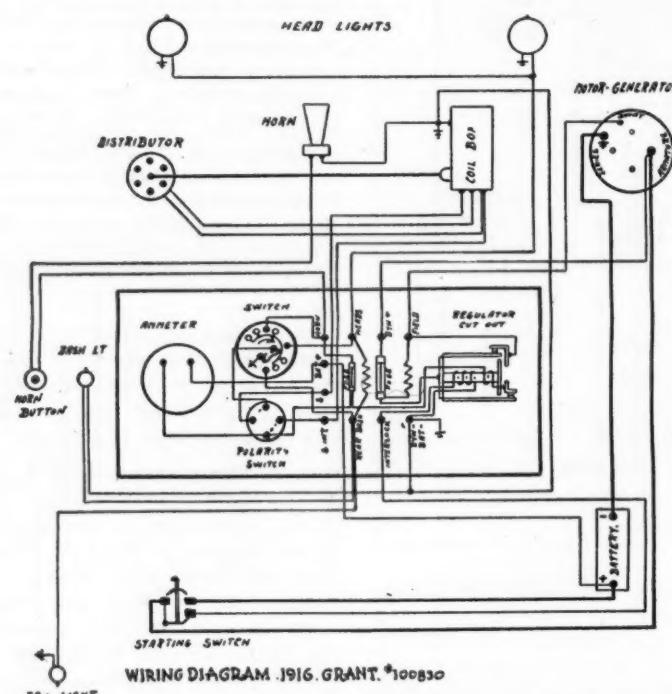
Q—A D-45 Buick 1917 model throttles down to a mile an hour, hitting on all six, accelerating at 50 m.p.h. Never misses a shot at these two speeds but when accelerating from one mile an hour on a pick up it loads up hitting and missing for half a block and then hitting on all six again.

I have had ignition tested, new distributor block put in, new clutch sprocket on generator shaft and new pistons and rings fitted. Compression registers equal in all cylinders; valves were ground and none of the valves are leaking. Have changed the setting of Marvel carburetor from lean to rich and from rich to lean, setting air adjustment at different points, but still engine continues to load up pick up after running slow for several blocks. These conditions exist regardless of engine temperature. Have been told it is caused from the coal oil which is now used in gasoline, but I have tried to control that by using a Curtis auxiliary radiator assembly valve but have gotten no results.—C. F. Robison, Amarillo, Tex.

We do not clearly understand just what a Curtis radiator assembly valve consists of, but we doubt very much whether any device has ever been manufactured that will separate kerosene from gasoline.

From description of the symptoms of this engine, we would advise that you install one of the replacement type of hot-spots and also that the ignition distributor shaft be replaced with a new one, or at least a new bearing, in order to remove all side play from the shaft which carries the distributor cam. Very puzzling causes of loading have been traced due to the fact that this camshaft has worn sufficiently to allow the interrupter point distance to vary at different speeds.

As before stated, it is impossible to separate kerosene from gasoline by any method of filtering or straining and we would suggest the installation of some type of replacement hot-spot in order to assist the vaporization of the present-day fuel.



An interesting example of "Come and Go" trouble is illustrated in this diagram

the engine runs O. K. and the generator charges correctly. What is the cause of this trouble?

1—Referring to the wiring diagram of this car, it will be seen that current from positive battery comes up to the instrument board and goes through the ammeter to the bottom terminal of the polarity switch. The top terminal of this same switch is shown grounded by a connection on the main lighting switch. Operation of the polarity switch, as indicated in the diagram, connects the positive battery current, which comes from the ammeter to the right hand terminal of the polarity switch from which a connection goes to the right hand terminal of the coil box and also to one of the interrupter terminals at the distributor.

The return circuit is through the interrupter and through the coil and back to the left terminal of the polarity switch, where the circuit is completed to ground. When the polarity switch is turned to the other position, not shown in the diagram, the connection is, from the bottom terminal to the left terminal and a separate connection is made from the top terminal to the right terminal.

In regard to the trouble being experienced, our first guess would be that there is a ground in one side of the interrupter, both points of which are supposed to be insulated. This means that, in one position of the polarity switch, the live battery current is connected di-

rectly to ground, causing a short circuit, which would pull a heavy current through the ammeter. In the other position by a corner of the frame or similar object. Another possibility is that one of the terminals of the polarity switch is grounded to the shell of the switch, which, by a possible connection to a metal cowl board, is causing the trouble.

Another possibility is that the wires are improperly placed on the polarity switch. This can be checked by reference to the diagram. If a ground is suspected, it might be well to disconnect the wires of the ignition circuit one at a time, while snapping the polarity switch to its different positions and, by studying the symptoms and the circuits of the diagram, it will be possible to locate the trouble.

2—This car is equipped with a two float Rayfield carburetor which drips continually. We have tried all sorts of remedies without results. Although the valves of the engine are in the best of condition and the compression is good, the engine starts hard. Is this due to the float level being too low for starting?

2—There is only one float in the Rayfield carburetor and if leaking is experienced a new needle and seat should be installed. These may be obtained from the Rayfield Carburetor Sales & Service Company, 3941 Washington Blvd., Chicago, and in ordering, the model of car should be carefully specified. Trouble in starting might be due to the ignition.

Rust, Scale and Dirt Causes of Overheating

Q—There was recently brought into our shop a 1919 National six-cylinder car, with the complaint that the engine overheated rapidly when climbing hills. Upon testing the car, the circulation and pump seemed to be in good condition, the top hose swelling under pressure of the hand upon speeding up the engine. The radiator has recently been cleaned and water circulation seemed free through the radiator, engine and pump. Oil pressure and system was examined and found free from dirt. On retard the timer back one inch after dead center on flywheel marking. Intake valves check with flywheel markings. Exhaust valve closes one inch early.

The present owner of the car has driven it 70,000 miles and claims at the present time from 15 to 17 miles on a gallon of gas. Valve clearance is .004 inch. On a 20-mile run, averaging from 20 to 30 m.p.h., the engine did not heat excessively, but in hill climbing, either with spark advanced or retarded, it heats excessively in less than three minutes. What is the possible cause of this condition?

1—From the fact that the car has run 70,000 miles, we would say that an accumulation of rust, scale or dirt in the cooling system, not only in the radiator but in the cylinder block, is the most likely cause of trouble. You do not state just how the radiator was cleaned, whether it was merely by running hot water through it or whether a very careful job was done, and we would accordingly suggest attention to this detail first. In connection with trouble in the water passages, would also point out that any leaks between the cylinders and water chambers may have allowed oil to work in and settle on the sides of the water passages. Oil, being a heat insulator, would tend to cause the trouble experienced.

In order to make sure that all oil and substance of like character is removed it is well to use a solution of baking soda, with one pound used to each gallon of water. This solution should be poured into the radiator and the engine run with the radiator covered until the water is boiling. The hose connection should then be pulled off quickly so that the water will rapidly drain out from the bottom of the cylinder block and radiator, carrying with it oil and dirt.

The above treatment does not have any effect on any lime deposit or alkaline deposit which may be on the sides of the cylinder jacket or radiator, and for removing this a solution of muriatic acid is recommended. Note that treatment of this kind is usually given to radiators by boiling the core in a tank, but if great care is used we do not see any reason why the treatment could not be given to the radiator while on the car. Great care should be taken, however, to keep it from coming in contact with the finish of the car, which would no doubt be damaged. The same general method of operation should be used, the engine being run with the radiator covered to warm up the solution, but in removing it while hot it would probably be just as well to use the regulation drain cock and avoid scattering the acid all over the place.

There is still another type of deposit

which will seriously interfere with cooling, and that is rusting which occurs on the cylinder block itself in the water passages. For removing this there is no well-known method, but from the Scientific American Encyclopedia of Formulae we find that sulphuric acid and a piece of zinc, with the zinc making contact with the iron, will operate to remove rust, there being a sort of short-circuited battery action which changes the rust back into iron. We accordingly see no reason why the hose connection could not be removed and a good size piece of zinc put into the water jacket and then the radiator and cylinder jackets filled with a solution of weak battery acid, this being diluted sulphuric acid.

This treatment is rather tedious, for a period of several days or a week is recommended to allow the rust to be entirely removed. The essential part of the progress is that the zinc must be in good electrical contact with the iron. Another method recommended for removing rust is to allow a nearly saturated solution of chloride of tin to remain on the article for from 12 to 14 hours.

There are, of course, a number of other causes for overheating. The muffler may be clogged. The carburetor may be set with too lean a mixture, which, while giving good results on level running, causes overheating on the hills. This is especially true when the cylinders are partially carbonized. There is also the possibility of brake dragging and fan belt slipping. It is also possible that the clutch is slipping. There is also the

possibility that light weight pistons of special design have been installed and possibly improperly fitted, being a little too tight so that on heavy pulling they expand and cause excessive heating.

2—Is there any method of cleaning bronze and brass on carburetors in over-haul work without affecting the material? —Mr. J. B. Ridley, Mgr., Service Garage, Yakima, Wash.

We again quote from the Scientific American Encyclopedia of Formulae: "There are many substances and mixtures which will clean brass. Oxalic acid, muriatic acid and several other acids will clean brass very effectively. Oxalic acid is the best, but the acid must be well washed off, the brass dried and then rubbed with sweet oil and tripoli, otherwise it will soon tarnish again. Mixture to clean brass is soft soap, 1 ounce; rottentone, 2 ounces."

NELSON ENGINE DATA

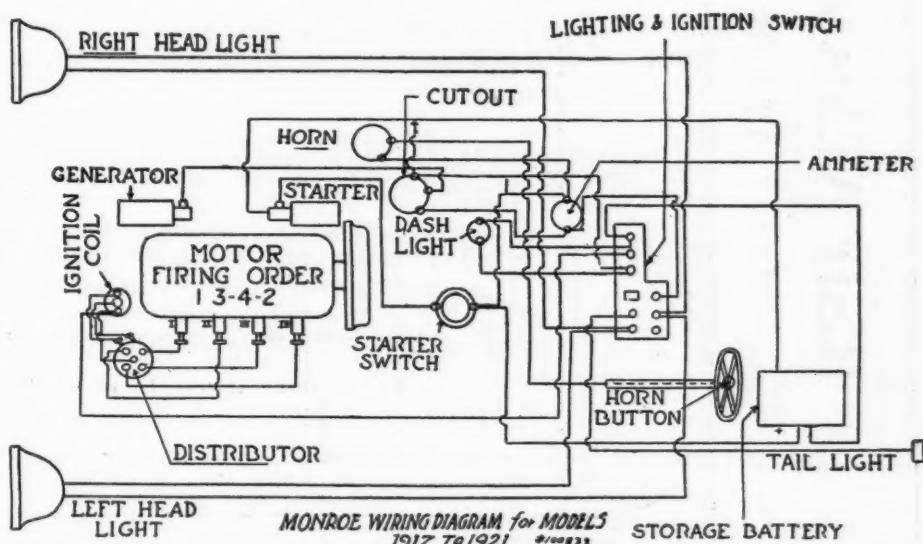
Q—Advise bore and stroke of Nelson engine, also r.p.m.

1—The bore and stroke of the Nelson engine is $3\frac{1}{8}$ by $4\frac{3}{4}$ in. The maximum r.p.m. is in the neighborhood of 3000 r.p.m.

2—Publish power curve of Fronty Ford racing cars, also the r.p.m. of the Fronty Fords.—A Reader.

2—No power curve is available regarding the Fronty Ford racing car engines and we would suggest that you communicate with the Chevrolet Bros. Mfg. Company, Indianapolis, Ind.

Wiring Diagram of Monroe



Q—We would like to have a wiring diagram for a Monroe touring car motor No. 9624 with Auto-Lite starter and generator and with cutout on dash and a four button switch. — McCue Garage, Goodells, Mich.

We are showing here a diagram which gives the wiring for Monroe cars from 1917 to 1921 and we believe this is the

one you require. If this should not be the correct diagram however, you will find on page 44 of the October 12, issue of MOTOR AGE a wiring diagram which is correct for the 1916 model and one or the other should be correct for your purpose. A careful study of the diagram always makes the trouble job easier.

Rear Axles on 1922 Passenger Cars

Motor Age Maintenance Data Sheet No. 192

MAKE AND MODEL	MAKE OF REAR AXLE	MODEL OF AXLE	REAR AXLE TYPE	GEAR RATIO	PROPELLION TAKEN BY	TORQUE TAKEN BY	FINAL DRIVE	SERVICE			EMERGENCY			Lubricant Capacity of Differential	TYPE OF LUBRICANT RECOMMENDED BY MAKER	
								No. Pieces Per Drum	Total Length Per Drum	Width	Thickness	No. Pieces Per Drum	Total Length	Width		
Ambassador, R.	Timken	5762	F	4.45	Springs	Torque Arm	Helical Bevel	2	50	2 1/2	3/16	2	86	2	2 qts.	600-W
American, C.	Salisbury	1382E	F	4.50	Springs	Springs	Spiral Bevel	2	43 1/2	2	3/16	1	41 1/2	2	2 qts.	600-W
Anderson, Series 40	Own	8-22	F	4.50	Springs	Springs	Spiral Bevel	1	48 1/2	2	3/16	1	44 1/2	2	2 qts.	600-W
Apperson, 8	Salisbury	1463C	F	4.25	Springs	Torque Arm	Spiral Bevel	1	43 1/2	2	3/16	1	41 1/2	2	2 qts.	600-W
Auburn, 6-51	Columbia	30000	F	5.00	Springs	Springs	Spiral Bevel	....	....	....	....	....	....	....	....	....
Bay State, 1.	Buick	1	F	4.67	Springs	Torque Tube	Spiral Bevel	2	36	2	21	2	38 1/2	2	2 qts.	600-W
Biddle, B-1 & B-5	Buick	2	F	3.92	Torque Tube	Torque Tube	Spiral Bevel	1	38 1/2	2	21	2	38 1/2	2	2 qts.	600-W
Brewster, 02.	Buick	6	F	4.6	Torque Tube	Torque Tube	Spiral Bevel	1	43 1/2	2	3/16	1	40 1/2	2	2 qts.	600-W
Buck, Six	Own	....	F	(4.9 or her options)	Torque Tube	Torque Tube	Spiral Bevel	1	34	2	3/16	1	32 1/2	2	2 qts.	600-W
Buick, Four	Timken	....	F	4.66	Torque Tube	Torque Arm	Spiral Bevel	1	54	2	3/16	1	51	2	4 qts.	600-W
Cadillac, 61	....	....	F	(4.50 or her options)	Springs	Torque Arm	Spiral Bevel	1	48	2	3/16	1	46 1/2	2	3 qts.	600-W
Case, X.	Columbia	31002	F	4.90	Springs	Torque Arm	Spiral Bevel	....	....	....	....	....	....	....	3 qts.	600-W
Case, W.	Columbia	....	F	(4.45 or her options)	Springs	Torque Arm	Spiral Bevel	....	....	....	....	....	....	....	3 qts.	600-W
Chalmers, 35C.	Adams	....	F	5.13	Springs	Springs	Spiral Bevel	....	....	....	....	....	....	....	4 qts.	600-W
Chandler, 1922	Own	....	F	4.45	Springs	Torque Tube	Spiral Bevel	1	27 1/2	1 1/4	3/16	1	26 1/2	1 1/4	2 1/2 qts.	40% Grease, 60% 600-W
Chevrolet, 490	Own	....	F	4.86	Springs	Torque Tube	Spiral Bevel	1	38	2	3/16	1	36	2	3 qts.	60% Grease, 60% 600-W
Chevrolet, FB	Own	....	F	(4.91 or her options)	Springs	Torque Tube	Spiral Bevel	1	48	2	3/16	1	46 1/2	2	4 qts.	60% Grease, 60% 600-W
Cleveland, 41	Own	....	F	4.45	Springs	Torque Tube	Spiral Bevel	1	38	2	3/16	1	36	2	3 qts.	600-W
Cole, 890	Columbia	30001	F	4.08	Springs	Torque Tube	Spiral Bevel	1	48	2	3/16	1	46 1/2	2	3 qts.	600-W
Columbia, Six.	Timken	5152	F	(4.46 or her options)	Torque Arm	Torque Arm	Spiral Bevel	2	38	1 1/16	3/16	2	78	1 1/16	2 qts.	600-W
Columbia, Challenger	Timken	5152	F	(6.09 or her options)	Torque Arm	Torque Arm	Spiral Bevel	1	43 1/2	2 1/4	3/16	1	43 1/2	2 1/4	3 1/2 qts.	600-W
Comet, CS3-2.	Columbia	50000	F	4.66	Torque Tube	Torque Springs	Spiral Bevel	1	36	2	3/16	1	32	2	3 qts.	600-W
Courier	Timken	....	F	5.30	....	....	....	....	....	....	....	....	....	....	3 qts.	600-W
Crawford, 22-6-60	Timken	....	F	4.45	....	....	....	....	....	....	....	....	....	....	3 qts.	600-W
Crawford, Dame.	Timken	....	F	4.27	....	....	....	....	....	....	....	....	....	....	3 qts.	600-W
Cummington, V.	Timken	....	F	4.27	....	....	....	....	....	....	....	....	....	....	3 qts.	600-W
Daniels, D19.	Timken	5762	F	4.23	Springs	Torque Arm	Spiral Bevel	1	54	2 1/2	3/16	1	54	2 1/2	3 qts.	600-W
Davis, 71	Timken	5002	F	4.50	Torque Tube	Torque Springs	Spiral Bevel	1	50 1/2	2 1/2	3/16	1	49 1/2	2 1/2	3 qts.	600-W
Davis, 61-47	Timken	....	F	5.10	Springs	Torque Tube	Spiral Bevel	4	79	2 1/2	3/16	2	86	2 1/2	3 qts.	600-W
Dixie Flyer, H.	Peru	....	F	4.75	Torque Tube	Torque Tube	Spiral Bevel	1	38	1 3/4	3/16	1	36	1 3/4	2 1/2 qts.	40% Grease, 60% 600-W
Dodge Brothers,	Own	....	F	4.16	Springs	Torque Tube	Spiral Bevel	2	38 1/2	2 1/2	3/16	2	36	2 1/2	3 qts.	600-W
Doris, 6-80.	Timken	5302	F	(3.76 or her options)	Springs	Torque Tube	Spiral Bevel	2	41	2 1/2	3/16	2	41	2 1/2	4 1/2 qts.	40% Grease, 60% 600-W
Dort, 19.	Flint	....	F	4.45	Torque Tube	Torque Tube	Spiral Bevel	1	35 1/2	1 1/8	3/16	1	35 1/2	1 1/8	4 qts.	600-W
Driggs, 1922	Own	....	F	4.60	Torque Tube	Torque Tube	Spiral Bevel	2	29	2 1/2	3/16	2	15	2 1/2	2 qts.	40% Grease, 60% 600-W
Dussenberg	Columbia	....	F	4.50	Springs	Torque Tube	Spiral Bevel	1	48	2 1/2	3/16	2	48	2 1/2	3 qts.	600-W
Dupont, A.	Adams	....	F	4.50	Springs	Torque Tube	Spiral Bevel	....	....	....	....	....	....	....	3 pds.	600-W
Durant, B-22	....	....	F	4.30	Springs	Torque Tube	Spiral Bevel	....	....	....	....	....	....	....	1 1/2 qts.	600-W
Earl, 40.	Timken	5120	F	5.08	Springs	Torque Tube	Spiral Bevel	....	....	....	....	....	....	....	35 1/2 qts.	600-W
Eclair, K-A.	Timken	40	F	3.66	Springs	Torque Tube	Spiral Bevel	1	40 1/2	2	3/16	1	21 1/2	2	2 qts.	600-W
Eclair, T-R.	Timken	....	F	4.75	Springs	Torque Tube	Spiral Bevel	1	43 1/2	2	3/16	1	41 1/2	2	2 qts.	600-W
Elgin K-1.	Timken	....	F	4.66	Springs	Torque Tube	Spiral Bevel	1	43 1/2	2	3/16	1	30	2	2 qts.	600-W
Essex.	....	....	F	(5.09 or her options)	Springs	Torque Tube	Spiral Bevel	1	40 1/2	2	3/16	1	42 1/2	2	2 1/2 qts.	600-W
Ford, T.	Timken	....	F	4.45	Torque Tube	Torque Tube	Spiral Bevel	1	35	1 1/8	3/16	1	35 1/2	1 1/8	2 pt.	600-W
Franklin, 9-B.	Own	10000	F	4.44	Springs	Torque Tube	Spiral Bevel	1	29	2 1/2	3/16	1	15	2 1/2	3 pt.	600-W
Gardner.	Timken	....	F	4.60	Springs	Torque Tube	Spiral Bevel	1	48	2 1/2	3/16	1	48	2 1/2	3 pt.	600-W
Grant.	....	....	F	3.90	Torque Tube	Torque Tube	Spiral Bevel	1	37 1/2	2	3/16	1	35 1/2	2	3 pt.	600-W
H. C. S.	....	....	F	4.92	Springs	Torque Tube	Spiral Bevel	1	43 1/2	2	3/16	1	41 1/2	2	3 pt.	600-W
Halliday, 4.	Flint	....	F	4.92	Springs	Torque Tube	Spiral Bevel	1	43 1/2	2	3/16	1	41 1/2	2	3 pt.	600-W
Halliday, 6.	....	....	F	4.92	Springs	Torque Tube	Spiral Bevel	1	43 1/2	2	3/16	1	41 1/2	2	3 pt.	600-W
Hanley-Knight, B.	Timken	5301	F	4.90	Springs	Torque Tube	Spiral Bevel	1	42	2	3/16	1	40	2	1 qt.	600-W
Hansen, 60.	Timken	5152	F	4.66	Springs	Torque Tube	Spiral Bevel	1	36	2	3/16	1	35	2	1 qt.	600-W
Hansen, 30.	Timken	....	F	4.63	Springs	Torque Tube	Spiral Bevel	1	36	2	3/16	1	35	2	1 qt.	600-W
Hastfield, A-12.	Columbia	10000	F	4.43	Springs	Torque Tube	Spiral Bevel	1	36	2	3/16	1	35	2	1 qt.	600-W

MAKE AND MODEL	MAKE OF REAR AXLE	MODEL OF AXLE	REAR AXLE TYPE	GEAR RATIO	PROPELLION TAKEN BY	TORQUE TAKEN BY	FINAL DRIVE	BRAKE-LINING SIZES					Lubricant Capacity of Differential			
								SERVICE			EMERGENCY					
								No. Pieces Per Drum	Total Length Per Drum	Width	Thickness	No. Pieces Per Drum	Total Length	Width	Thickness	
Haynes, 55.	Own	55	3/4F	4.11	Spring	Spring	Spiral Bevel	1	46%	1 1/4	1 1/4	1	46%	1 1/4	1 1/4	4 qt.
Haynes, 48.	Own	75	3/4F	4.60	Spring	Spring	Spiral Bevel	1	49%	2 1/2	1 1/4	1	45%	2 1/2	1 1/4	4 qt.
Hernes, 75.	Timken	5305	3/2F	4.90	(4.46 or her option)	Spring	Spiral Bevel	2	43%	2 1/2	1 1/4	2	40%	2 1/2	1 1/4	4 qt.
Haines, Series 4.	Timken	R	3/4F	4.895	Spring	Spring	Spiral Bevel	1	33 1/2	2	1 1/4	1	33 1/2	2	1 1/4	40% Grease, 60% 600-W
Hudson, Super 6.	Timken	R	3/4F	4.87	Spring	Spring	Spiral Bevel	2	37	2	1 1/4	1	15 1/2	2	1 1/4	40% Grease, 60% 600-W
Hupmobile, R.	Salisbury	124	3/4F	4.75	Spring	Spring	Spiral Bevel	2	36	2	1 1/4	1	15 1/2	2	1 1/4	40% Grease, 60% 600-W
Jackson, 52.	Timken	5110	3/4F	4.46	Spring	Spring	Spiral Bevel	2	85	1 1/2	1 1/4	1	20 1/2	2 1/2	1 1/4	600-W
Jewett, Sir.	Timken	50000	3/4F	4.085	Spring	Spring	Spiral Bevel	1	48	2 1/2	1 1/4	1	46%	2 1/2	1 1/4	600-W
Jordan, MX.	Columbia	King, K.	3/4F	4.875	other option	Spring	Spiral Bevel	2	39 1/2	2	1 1/4	2	39 1/2	2	1 1/4	2 1/2 qt.
Kasai.	Own	2050	3/4F	4.75	Spring	Spring	Spiral Bevel	1	38	2 1/2	1 1/4	1	51 1/2	2 1/2	1 1/4	600-W
Kline, 6-55-X.	Stanpar	Own	3/4F	4.68	Torque Tube	Torque Arm	Spiral Bevel	1	54	2 1/2	1 1/4	1	51 1/2	2 1/2	1 1/4	600-W
LaFayette, 134.	Timken	5305	3/4F	5.10	Spring	Spring	Spiral Bevel	1	45	2	1 1/4	1	28 1/2	2 1/2	1 1/4	600-W
Leich, 999.	Timken	Own	3/4F	4.75	Torque Tube	Torque Arm	Spiral Bevel	2	40 1/2	1 1/4	1 1/4	1	23 1/2	1 1/4	1 1/4	600-W
Levington, 23.	Timken	Own	3/4F	4.66	Spring	Spring	Spiral Bevel	1	49 1/2	1 1/4	1 1/4	1	49 1/2	1 1/4	1 1/4	600-W
Liberty, 10-D.	Timken	Own	3/4F	4.75	Opt.	Radius Rods	Spiral Bevel	1	48 1/2	1 1/4	1 1/4	2	29	2 1/2	1 1/4	5 qt.
Laclein, 48.	Lecomobile, 48.	Own	3/4F	3.80	of her option	Radius Rods	Spiral Bevel	1	48 1/2	1 1/4	1 1/4	1	48 1/2	1 1/4	1 1/4	600-W
McFarlan, T. V.	Timken	Own	3/4F	3.75	Torque Tube	Torque Arm	Spiral Bevel	1	50 1/2	2 1/4	1 1/4	1	47 1/2	2 1/4	1 1/4	600-W
Marmen, 34.	Own	3/4F	4.56	her option	Radius Rods	Spring	Spiral Bevel	1	54	2	1 1/4	1	47 1/2	2 1/4	1 1/4	2 qt.
Maxwell.	Own	30000	3/4F	4.87	Spring	Spring	Spiral Bevel	1	24	2 1/4	1 1/4	1	38	2 1/4	1 1/4	3 pt.
Mercur.	Own	30000	3/4F	4.60	Spring	Spring	Spiral Bevel	1	44	2	1 1/4	1	38	2 1/4	1 1/4	40% Grease, 60% 600-W
Merk.	Own	30000	3/4F	4.42	Spring	Spring	Spiral Bevel	1	35	2	1 1/4	1	38	2 1/4	1 1/4	600-W
Mitchell, F. 50.	Own	3/4F	5.30	Radius Rods	Spring	Spring	Spiral Bevel	2	40 1/2	1 1/4	1 1/4	1	42 1/2	2	1 1/4	600-W
Monroe.	Own	5000	3/4F	5.45	Spring	Spring	Spiral Bevel	1	48	2	1 1/4	1	42 1/2	2	1 1/4	600-W
Moon, 6-40.	Timken	5112	3/4F	4.88	Spring	Spring	Spiral Bevel	1	46 1/2	2	1 1/4	1	46	2	1 1/4	600-W
Moor, 6-45.	Timken	5000	3/4F	4.50	Spring	Spring	Spiral Bevel	1	40 1/2	2	1 1/4	1	40 1/2	2	1 1/4	600-W
Nash, 4.	Own	50000	3/4F	4.45	Spring	Spring	Spiral Bevel	1	35	2	1 1/4	1	35	2	1 1/4	600-W
Nash, 6.	Own	50000	3/4F	4.45	Spring	Spring	Spiral Bevel	1	35	2	1 1/4	1	35	2	1 1/4	600-W
National, B.B.	Columbia	Own	3/4F	5.00	Spring	Spring	Spiral Bevel	2	35	1 1/2	1 1/4	1	35	1 1/2	1 1/4	2 qt.
Neoma, 1D.	Timken	5302	3/4F	4.68	Spring	Spring	Spiral Bevel	1	48	2	1 1/4	1	48	2	1 1/4	2 qt.
Neoma, 3C.	Timken	10000	3/4F	4.66	Spring	Spring	Spiral Bevel	1	43 1/2	2	1 1/4	1	40 1/2	2	1 1/4	2 qt.
Norwalk, 4-30 KS.	Weston Mott	68023	3/4F	4.93	Spring	Spring	Spiral Bevel	1	38 1/2	2	1 1/4	1	35 1/2	2	1 1/4	2 qt.
Oakland, 6-44.	Columbia	150232	3/4F	4.66	Spring	Spring	Spiral Bevel	1	38 1/2	2	1 1/4	1	35 1/2	2	1 1/4	2 qt.
Ogden, 46.	Weston Mott	230165	3/4F	5.10	Spring	Spring	Spiral Bevel	1	38 1/2	2	1 1/4	1	35 1/2	2	1 1/4	2 qt.
Oldsmobile, 43A.	Own	5000	3/4F	4.50	Torque Tube	Torque Arm	Spiral Bevel	1	45	2	1 1/4	1	39 1/2	2	1 1/4	5 pt.
Oldsmobile, 47.	Timken	5302	3/4F	4.30	Torque Tube	Torque Arm	Spiral Bevel	1	45	2	1 1/4	1	42 1/2	2	1 1/4	5 pt.
Overland, 4.	Own	5000	3/4F	4.36	Torque Arm	Torque Arm	Spiral Bevel	1	53 1/2	2	1 1/4	1	48 1/2	2	1 1/4	2 qt.
Packard, Twin Six.	Own	5000	3/4F	4.56	Spring	Spring	Spiral Bevel	1	37 1/2	2	1 1/4	1	35 1/2	2	1 1/4	2 qt.
Paige, 6-40.	Salsbury	5302	3/4F	4.75	Spring	Spring	Spiral Bevel	1	41 1/2	2	1 1/4	1	38 1/2	2	1 1/4	5 qt.
Paley, 22-6-52.	Stanpar	5302	3/4F	4.50	Spring	Spring	Spiral Bevel	1	38 1/2	2	1 1/4	1	38 1/2	2	1 1/4	5 qt.
Pearless, 56.	Own	5000	3/4F	3.93	Torque Arm	Torque Arm	Spiral Bevel	1	51 1/2	3 1/2	1 1/4	1	33 1/2	2 1/2	1 1/4	5 qt.
Pierce-Arrow, 33.	Timken	30000	3/4F	4.26	1/2 other option	Spring	Spiral Bevel	1	50 1/2	2	1 1/4	1	46 1/2	2 1/2	1 1/4	5 qt.
Fiat, 6-50.	Columbia	.....	3/4F	4.66	Spring	Spring	Spiral Bevel	1	43 1/2	1 1/4	1 1/4	1	42	1 1/2	1 1/4	1/5
Premier, 6-D.	Timken	5302	3/4F	5.09	of her options	Spring	Spiral Bevel	2	43 1/2	2	1 1/4	2	41 1/2	2	1 1/4	5 pt.
R & V Knight, J.	Timken	5302	3/4F	4.90	Spring	Spring	Spiral Bevel	1	43 1/2	2	1 1/4	2	39	2	1 1/4	2 qt.
R & V Knight, R.	Timken	5302	3/4F	4.70	Spring	Spring	Spiral Bevel	1	43 1/2	2	1 1/4	2	56	2	1 1/4	600-W
Ree, TS & US.	Reeves	5302	3/4F	4.70	Torque Tube	Torque Arm	Spiral Bevel	1	43 1/2	2	1 1/4	2	47	2	1 1/4	600-W
Riveter, 6-34-E.	Timken	5302	3/4F	4.63	Spring	Spring	Spiral Bevel	2	40	2	1 1/4	2	48	2	1 1/4	600-W
Bell Revere.	Own	2050	3/4F	4.085	of her option	Spring	Spiral Bevel	2	24	1/2	1 1/4	2	48	1/2	1 1/4	3 pt.
Saxon, 12G.	Stanpar	5302	3/4F	3.76	Spring	Spring	Spiral Bevel	6	33 1/2	2	1 1/4	2	35 1/2	2	1 1/4	600-W
Rickenbacker.	Peru	5302	3/4F	4.75	Torque Tube	Torque Arm	Spiral Bevel	1	44 1/2	2	1 1/4	2	42 1/2	2	1 1/4	600-W
Sayens, L2 & Oz.	Timken	5302	3/4F	4.45	Spring	Spring	Spiral Bevel	1	36	1/2	1 1/4	2	37 1/2	2	1 1/4	600-W
Sayens, 50 & 51.	Peru	5302	3/4F	4.50	Spring	Spring	Spiral Bevel	2	39	1/2	1 1/4	2	34	1/2	1 1/4	600-W
Sparting.	Standard	250	3/4F	4.45	Spring	Spring	Spiral Bevel	1	34	1/2	1 1/4	2	36 1/2	2	1 1/4	600-W
Stanley, 715.	Timken	5302	3/4F	4.50	Spring	Spring	Spiral Bevel	1	36	1/2	1 1/4	2	20	1/2	1 1/4	3 pt.
Sanwood, A-22.	Stanpar	5302	3/4F	4.50	Spring	Spring	Spiral Bevel	2	44 1/2	2	1 1/4	2	35 1/2	2	1 1/4	600-W
Stearns Knight, SKA.	Own	5302	3/4F	5.40	of her options	Spring	Torque Tube	2	30	2	1 1/4	2	24	1/2	1 1/4	BRONZE
Stearns-Duryea, E.	Timken	5302	3/4F	5.94	Spring	Spring	Torque Tube	2	30	2	1 1/4	2	24	1/2	1 1/4	600-W

MAKE AND MODEL	MAKE OF REAR AXLE	MODEL OF AXLE	REAR AXLE TYPE	GEAR RATIO	PROPELLION TAKEN BY	TORQUE TAKEN BY	FINAL DRIVE	SERVICE				EMERGENCY				Lubricant Capacity of Differential	TYPE OF LUBRICANT RECOMMENDED BY MAKER
								No. Pieces Per Drum	Total Length Per Drum	Width	Thickness	No. Pieces Per Drum	Total Length	Width	Thickness		
Studebaker, Big 6	Own	Studebaker, Spec. 6	Own	3.70	Spring	Spring	Spiral Bevel	2	93 ¹ / ₂	2	5 ¹ / ₂	2	39 ¹ / ₂	1 ³ / ₄	5 ¹ / ₂	4 qt.	.....
Studebaker, Light 6	Own	Studebaker, Spec. 6	Own	4.00	Spring	Spring	Spiral Bevel	2	93 ¹ / ₂	2	5 ¹ / ₂	2	86 ¹ / ₂	1 ³ / ₄	5 ¹ / ₂	4 qt.	.....
Stutz, K...	Own	Stutz, K...	Own	4.35	Spring	Torque Tube	Spiral Bevel	2	87 ¹ / ₄	2	5 ¹ / ₂	2	79 ¹ / ₄	1 ³ / ₄	5 ¹ / ₂	4 qt.	.....
Templar, 445	U. S.	Templar, 445	3.30	3.70	Spring	Spring	Spiral Bevel	2	40 ¹ / ₄	2 ¹ / ₂	5 ¹ / ₂	2	34 ¹ / ₄	1	5 ¹ / ₂	2 qt.	600-W
Tulsa	U. S.	Salisbury	.....	4.40	Spring	Spring	Spiral Bevel	2	34 ¹ / ₄	1 ¹ / ₂	5 ¹ / ₂	2	34 ¹ / ₄	1	5 ¹ / ₂	2 qt.	600-W
Value, 58	Own	Value, 58	.....	4.50	Spring	Spring	Spiral Bevel	2	39 ⁵ / ₈	1 ¹ / ₂	5 ¹ / ₂	1	42 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	2 qt.	600-W
Value, 48	Own	Timken	.....	4.55	Spring	Spring	Spiral Bevel	2	39 ⁵ / ₈	1 ¹ / ₂	5 ¹ / ₂	1	42 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	2 qt.	600-W
Value, 34	Own	Columbia	.....	4.60	Spring	Spring	Spiral Bevel	2	39 ⁵ / ₈	1 ¹ / ₂	5 ¹ / ₂	1	42 ¹ / ₂	1 ¹ / ₂	5 ¹ / ₂	2 qt.	600-W
Value, 34	Own	Columbia	.....	4.65	Spring	Spring	Spiral Bevel	1	43 ¹ / ₈	2	5 ¹ / ₂	1	39	1 ¹ / ₂	5 ¹ / ₂	2 qt.	600-W
Washington, D-48	.....	Timken	.....	4.67	Spring	Torque Arm	Spiral Bevel	.....	40 ¹ / ₂	2	5 ¹ / ₂	1	22 ¹ / ₂	2	5 ¹ / ₂	4 qt.	600-W
Westcott, A-44	Timken	Timken	.....	4.45	Spring	Spring	Spiral Bevel	2	41	2	5 ¹ / ₂	2	38 ¹ / ₂	1 ³ / ₄	5 ¹ / ₂	3 qt.	600-W
Wills, St. Clair, A-48	Own	Wills, St. Clair, A-48	.....	4.90	Spring	Torque Tube	Spiral Bevel	.....	50 ¹ / ₄	2 ¹ / ₂	5 ¹ / ₂	2	46 ¹ / ₂	2 ¹ / ₂	5 ¹ / ₂	7 qt.	600-W
Willys-Knight, 20	Own	Willys-Knight, 20	.....	4.44	Spring	Torque Arm	Spiral Bevel	.....	50 ¹ / ₄	2 ¹ / ₂	5 ¹ / ₂	2	46 ¹ / ₂	2 ¹ / ₂	5 ¹ / ₂	5 ¹ / ₂	.....
Winson, 40	Timken	Winson, 40	.....	4.58	Spring	Torque Arm	Spiral Bevel	.....	50 ¹ / ₄	2 ¹ / ₂	5 ¹ / ₂	2	46 ¹ / ₂	2 ¹ / ₂	5 ¹ / ₂	5 ¹ / ₂	.....
1 ¹ / ₂ F—Semi-floating. F—Floating.		Non Fluid Oil.		.....		.....		.....		.....		.....		.....		.....

Steering Gears on 1922 Passenger Cars

Motor Age Maintenance Data Sheet No. 193

MAKE & MODEL	Make of Steering Gear	MODEL	TYPE	MAKE & MODEL	MODEL	TYPE	MAKE & MODEL	MODEL	TYPE	MAKE & MODEL	MODEL	TYPE	MAKE & MODEL	MODEL	TYPE	LIA-100
Anderson, 40	Gemmer	W & W	Holiday	C. A. S.	4	...	Olsmobile	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & N
Aparton, 8	Own	S & N	Handley Knight	B	6	...	Packard	W & W	W & W	W & W	W & W	W & W	W & W	W & W	S & N
Auburn, 6-51	Jacob	L	Hansen	Six	...	Paige	.....	W & S	W & S	W & S	W & S	W & S	W & S	W & S	S & N
Bay State, Ambassador, R.	Jacob	L-2A	Hastfield	A-42	...	Paige	.....	S & N	S & N	S & N	S & N	S & N	S & N	S & N	S & N
American, C.	.....	J	Haynes	48	...	Paige	.....	S & N	S & N	S & N	S & N	S & N	S & N	S & N	S & N
Biddle, B. & B.	.....	W & W	Haynes	55	...	Pestles	.....	S & N	S & N	S & N	S & N	S & N	S & N	S & N	S & N
Brewster, 82	.....	S & N	Haynes	75	...	Pestles	.....	S & N	S & N	S & N	S & N	S & N	S & N	S & N	S & N
Buck	Four	S & N	Homes	Four	...	Perc Arrow	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Buck	Four	S & N	Hudson	6	...	Pilot	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Cadillac	61	S & N	Hupmobile	R	...	Premier	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Case	X	S & N	Jackson	638	...	R & V Knight	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Case	W	S & N	Jewett	MI	...	R & V Knight	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Chalmers	35C	C. A. S.	Jordan	K	...	Ree.	.....	W & S	W & S	W & S	W & S	W & S	W & S	W & S	W & S
Chalmers	1922	C. A. S.	Plan	K	...	Revere	.....	W & S	W & S	W & S	W & S	W & S	W & S	W & S	W & S
Chevrolet	49	Own	S & N	Kissel	...	Rickenbacker	.....	W & S	W & S	W & S	W & S	W & S	W & S	W & S	W & S
Chevrolet	FB	Own	S & N	Kissel	...	Ramer	.....	W & S	W & S	W & S	W & S	W & S	W & S	W & S	W & S
Cleveland	40	C. A. S.	Lafayette	134	...	Stanley	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Cole	870	Gemmer	Leach	99	...	Stearns	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Columbus	CC	C. A. S.	Mahle	ST	...	Stephens	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Comet	Light 6	Gemmer	Marshall	T	...	Taylor	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Cunningham	CS	W & W	Maxwell	10-D	...	Tull	.....	W & S	W & S	W & S	W & S	W & S	W & S	W & S	W & S
Dodge	19	Jacob	Moore	...	...	Velin	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Dodge	1922	C. A. S.	Nash	5	...	Velie	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Durant	71	Ross	Nash	...	...	Velie	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Durant	71	Warner	Nash	...	...	Velie	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Durant	H	...	Nash	...	...	Velie	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Dodge Brothers	6-80	Ross	Nash	...	...	Velie	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Dodge Brothers	19	...	Nash	...	...	Velie	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Duesenberg	1922	C. A. S.	Nash	...	...	Velie	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Durant	71	...	Nash	...	...	Velie	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Durant	H	...	Nash	...	...	Velie	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Durant	40	...	Nash	...	...	Velie	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Eclair	...	Foxter	Nash	...	...	Velie	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Eclair	...	Gemmer	Nash	...	...	Velie	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Eclair	...	K-1	Nash	...	...	Velie	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Eclair	...	Gemmer	Nash	...	...	Velie	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Eclair	...	Gemmer	Nash	...	...	Velie	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Eclair	...	Gemmer	Nash	...	...	Velie	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Eclair	...	Gemmer	Nash	...	...	Velie	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Eclair	...	Gemmer	Nash	...	...	Velie	.....	W & W	W & W	W & W	W & W	W & W	W & W	W & W	W & W
Eclair	...	Gemmer	Nash	...	...	Velie	.....	W & W	W & W	W & W	W & W	W &			

BOOSTING ACCESSORY SALES

This is the last call for Christmas—if you haven't that decorating, then do it now, you've missed something and you'll miss more if you don't hurry. Have you decided that every family in your territory, whether they are car owners or not should buy something from you?

Perhaps you will find a suggestion or two on this page that you could carry to your customers—there are all kinds of things that you can sell if you will just try to.

If you can do nothing else, sell a man a service job on a car for his friend but you should be able to unload a great number of accessories, too.

The Cole Visible Gasoline Gage is the product of the Semco Engineering Co., Dayton, O., and fits on the dash on any model Ford car. A small red indicator in sharp contrast with the white background, shows the exact amount of gasoline in the tank \$6.

The Milwaukee Grip Rack is pictured on this page, showing its uses. When not holding luggage, it can be folded onto the running board and is almost invisible. Made in three sizes for Fords and larger cars, selling at \$5, \$6 and \$7. Made by the Milwaukee Motor Products Co., Milwaukee.

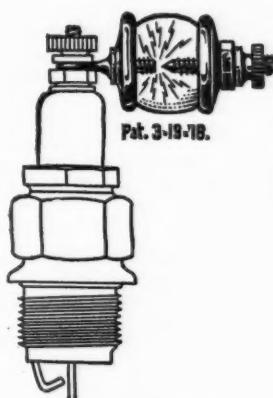
The Universal Spark Plug Intensifier is the product of the Universal Mfg. & Sales Co., 552 W. Harrison Street, Chicago. These intensifiers have adjustable terminal point set in a bull's eye cylinder of glass which magnifies the spark, giving a clear vision from every angle.

Made in various sizes to fit a large number of the standard makes of rims by the Gray company's own process. Other sizes and styles are offered in addition to these, covering all makes of rims.—Gray Machine & Parts Corp., Batavia, Ill.

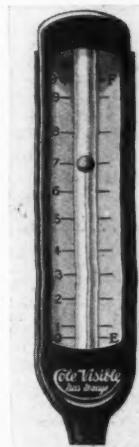
The Schofield Timer is the product of the Schofield Mfg. Co., Cleveland, O., and is composed of four parts, the shell, the rotor, the shaft collar and the coiled spring. The shell is made of pressed steel, enamelled and baked, contact points are hard brass. The four parts are shown in the cut. Price \$3.50.

The Presto Cigar Lighter is equipped with five feet of heavy cord, which the cord winder automatically winds up when the cigar lighter is not in use. The two terminals on the cord winder are tape connected, one to the ammeter and the other to one terminal of the battery.

When the motorist wishes to light his cigar or cigarette, he simply reaches for the cigar lighter and takes it from the holder, pulling out sufficient cord to reach easily any occupant of the car. The wire in the Presto Cigar Lighter tip becomes white-hot instantly. Replacing the cigar lighter in its socket in the dash automatically shuts off the current.



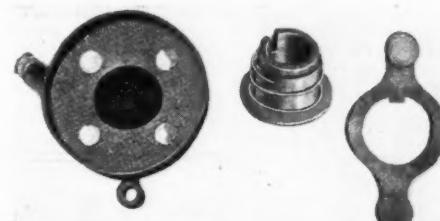
Universal spark plug intensifier



Cole visible gasoline gage



Milwaukee grip rack



Schofield timer



Gray Wrench



Sure stop foot brake for Fords



Presto cigar lighter

Manufactured by Metal Specialties Mfg. Co., 338-352 North Kedzie Avenue, Chicago.

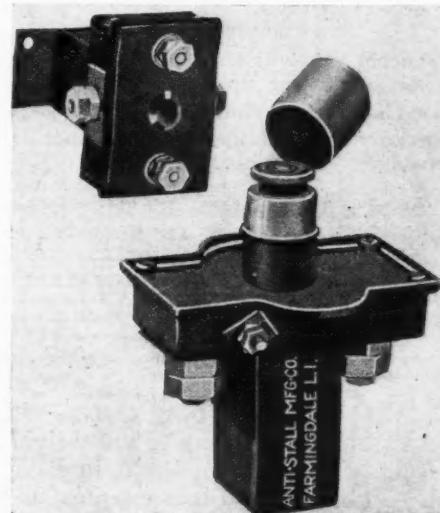
Ideal asbestos transmission lining is designed for use on Ford cars and sells for \$2.25 per set. It is furnished in rolls and sets, including rivets. It is sold by the Hasco Sales Co., Galesburg, Ill.

The Sure Stop Foot Brake for Fords operates on the outside of the rear wheel drums and is said to have a positive equalized pull. It is made by the Sure Stop Brake Co., 14 Liberty Avenue, Pittsburgh.

A non-skid chain for pneumatic tires is being manufactured by the Arrow Grip Mfg. Co., Glens Falls, N. Y. The chains are featured by an easy cross chain replacement, which is accomplished by means of a fastener. This fastener is a hook containing a slotted button which can be turned to remove from the side chains. The cut illustrates the chain.

In describing the Anti-Stall, the manufacturers say, "it starts the motor by simply turning on the ignition switch and as soon as the motor starts running, the switch is automatically released by the generator. Should the automatic feature fail to work, due to broken wire or other trouble, the motor can always be started by using the emergency button after removing the protection cap located on the floor board." The Anti-Stall Mfg. Co., Farmingdale, L. I.

Alemite Lubricating Spring Covers, especially designed for Fords and retailing at \$8.50 have been announced by The Bassick Manufacturing Co., Chicago. These flexible all-steel covers, which are proof against water, rust, dust and road grit, hold sufficient lubricant to keep the springs lubricated and functioning for six months before re-greasing is necessary. They are equipped with standard Alemite fittings so that they may be quickly and easily packed with lubricant by means of the Alemite compressor.



Anti-Stall

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

New York	Eighteenth Annual Automobile Salon	Dec. 3-9
New York	Annual Show	Jan. 6-13
New York	National Automobile Body Builders' Show	Jan. 8-13
Oakland, Cal.	Fifth Annual Show	Jan. 13-20
Buffalo	Annual Automobile Show	Jan. 13-20
Philadelphia.....	At the Commercial Museum Bldg.	Jan. 13-20
Hudson, N. Y.	Annual Automobile Show	Jan. 16-20
Cleveland, O.	Annual Winter Show, Cleveland Automobile Mfr's and Dealers' Asn.	Jan. 20-27
Milwaukee	Annual Automobile Show	Jan. 20-27
Baltimore.....	Annual Automobile Show	Jan. 20-27
Detroit.....	At the Municipal Garage	Jan. 20-27
Chicago	Annual Show at Coliseum N. A. C. C.	Jan. 27-Feb. 3
Chicago	Annual Automobile Salon	Jan. 27-Feb. 3
Ann Arbor, Mich. ....	.....	Jan. 29-Feb. 3
Portland, Ore.	Annual Automobile Show	Feb. ..
Atlanta	Annual Automobile Show	Feb. ..
Minneapolis, Minn.	Annual Show	Feb. 3-10
Troy, N. Y.	Annual Automobile Show	Feb. 3-10
Winnipeg, Can.	Minto Barracks	Feb. 5-10
Charlotte, N. C. ....	.....	Feb. 5-10
Lansing, Mich. ....	.....	Feb. 5-10
Waterbury, Conn.	Annual Automobile Show	Feb. 5-12
Toledo	Annual Automobile Show	Feb. 5-10
Cincinnati	Automobile Show	Feb. 7-14
Kansas City, Mo.	Annual Automobile Show	Feb. 10-17
St. Louis.....	St. Louis Automobile Dealers' Assn.	Feb. 12-17
Kalamazoo, Mich. ....	.....	Feb. 12-17

Flint, Mich.	Feb. 12-17	
San Francisco.....	Exposition, Auditorium	Feb. 17-24
Gr'd Rapids, Mich. ....	.....	Feb. 19-24
Mt. Clemens, Mich. ....	.....	Feb. 19-24
Louisville	Annual Automobile Show	Feb. 19-24
Trenton, N. J.	Annual Automobile Show	Feb. 21-24
Des Moines, Ia.	Annual Show	Feb. 23-Mar. 3
Brooklyn, N. Y.	Annual Automobile Show of the Brooklyn Motor Vehicle Deal- ers' Association	Feb. 24-Mar. 3
Muskegon, Mich. ....	.....	Feb. 26-Mar. 3
Syracuse, N.Y.	Annual Automobile Show	Feb. 26-Mar. 3
Springfield, Mass.	Annual Automobile Show	Feb. 26-Mar. 3
Omaha.....	Annual Automobile Show	Feb. 26-Mar. 3
Indianapolis.....	Indianapolis Automobile Trade Assn., Mar.	5-10
Bay City, Mich. ....	.....	Mar. 5-10
Newark, N. J.	Annual Automobile Show	Mar. 10-17
Washington, D. C.	Spring Show, Convention Hall	Mar. 11-17
Port Huron, Mich. ....	.....	Mar. 12-17
Battle Creek, Mich. ....	.....	Mar. 19-24
Alpena, Mich. ....	.....	Apr. 2-7

CONVENTIONS

Toledo	Annual Convention of the Ohio Automotive Trades' Assn.	Dec. 6-8
Indianapolis	Annual Convention, Indiana Auto- motive Trade Association	Dec. 12
Chicago	Annual Meeting, Automotive Electric Service Association	Jan. 29-31
Quincy, Ill.	Annual Meeting Illinois Automotive Trade Association	Mar. 19

RACES

San Diego, Calif.	January
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SQUEEKS & RATTLES

If You Know Any, Tell Them to Us

Did you say something, or was that a wagon spoke?

If a motor meet a motor,
Coming 'round the curve,
If the first don't sound his signal,
Need the second swerve?

Drat the chap that holds the highway,
Neither toots nor turns,
Hope he chokes and that hereafter,
In gasoline he burns.

—Kenneth Kee.

FLYING START

An old yokel saw a motor-car for the first time in his life. It came dashing up the main street, and disappeared in a cloud of dust. "Well," said the yokel, "the horses must ha' bin goin' a good speed when they got loose from that carriage."—Brisbane Mail.

"Mors is Reorganized—By Mail"—News headline. Oh, these correspondence schools are the axle's ankle, all right.

EPITAPH OF A SPEEDER
*No more he'll run a buzz machine,
Gone where they don't use gasoline.*

As has been said, the new skirts are like certain tires—they're wearing them longer and longer.

A DIRTY ARABIAN TRICK

She waddled up to the weighing machine,
In the light of the fading day,
She dropped in a counterfeit nickel
And silently stole a weigh.

FALL FASHIONS FROM THE AIR HOSE

Gas Tanks will be worn fuller this year
Loose bearings will be considerably tighter
Plain and pleated tires will be done with
an overskirt of chains in wet weather.
Headlights will be lowered to a definite
length.

"11 Governors for 2-cent gas tax."—We wouldn't give half a cent for some of them.

Gas N. Oil, editor of "The Air Hose," the Muller Bros. publication in Hollywood, says that a gambler who cleans up a few thousand thinks he's made a stake but that the washing and polishing crew of their organization cleans up \$50,000 worth of swell cars every day and thinks nothing of it.

And again, a dare devil has something wrong with his light head
But a glare devil has something wrong with his headlight.

"Alfred Pickup has taken the agency for the Chevrolet in Holyoke, Mass."—News item. That's a good name for an automobile dealer.

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive		
				Front	Rear						Front	Rear						Front	Rear			
Acason.....	3/4-1	\$1650a	33x4x5	34x5n	34x5n	W	Commerce.....	18	21/2	\$2495	41x5x5 1/4	36x6n	40x8n	W	Gary.....	K	31/2	\$3790	41x4x6	36x5	40x5d	W
Acason.....RB	1 1/2	1950	33x5x5 1/4	36x3 1/2	36x6	W	Commerce.....	25	21/2	2425	41x5x5 1/4	36x4	36x7	W	Gary.....M	M	5	4450	5 x6 1/2	36x6	40x6d	W
Acason.....H	2 1/2	2750	43x6x5 1/4	36x4k	36x8k	W	Commerce.....	25	21/2	2770	41x5x5 1/4	36x6	40x8n	W	Gersix.....	M	1 1/2	3100	4 x5 1/2	36x3 1/2	36x7	W
Acason.....L	3 1/2	3150	43x6x5 1/4	36x5k	36x10k	W	Cook.....	51	21/2	3600	4 x5 1/2	36x5	40x8n	W	Gersix.....K	K	2 1/2	3500	41x4x5 1/2	36x4	36x8	W
Acason.....M	5	4350	5 x6 1/2	36x6	40x12	W	*Corbitt.....	3/4-1	1250	31x5 1/2	33x5n	33x5n			Geraix.....	K	3 1/2	4500	41x2x6	36x5	40x12	W
Ace.....	30 11-13	2400	33x5x5 1/4	31x3 1/2	31x3	W	Corbitt.....	E-22	1	1480	33x5 1/4	34x3 1/2	34x4	W	Godfredson.....	20	1	2075	33x4x5 1/2	34x5	34x5	W
Ace.....40	2	2850	41x5x5 1/4	36x4	36x7	W	Corbitt.....D-22	1 1/2	2200	33x5 1/4	34x3 1/2	34x5		Godfredson.....	31 1/2	3000	x5 1/4	36x6	35x7	WW		
Ace.....60 21/2-3	3400	41x5x5 1/4	36x4	36x8	W	Corbitt.....C-22	2	2600	41x5x5 1/4	36x3 1/2	36x7	W	Godfredson.....A	2 1/2	3375	4 x5 1/2	36x4	36x7	W			
Acme.....20	1	...	33x5 1/4	31x3 1/2	31x5	W	Corbitt.....B-22	2 1/2	3000	41x5x5 1/4	36x4	36x7	W	Godfredson.....B	3 1/2-4	4475	41x2x5 1/2	36x5	36x10	W		
Acme.....30 1/2	...	33x5 1/4	31x3 1/2	31x5	W	Corbitt.....R-2	3	3200	41x5x5 1/4	36x4	36x8	W	Godfredson.....100	5-6	5500	5 x6 1/2	36x6	40x14	W			
Acme.....40	2	...	33x5 1/4	31x3 1/2	31x5	W	Corbitt.....A-22	3 1/2-4	3800	41x5x5 1/2	36x5	36x10	W	Graham Bros.....	1	285	37x4x4 1/2	33x4 1/2	34x5n	B		
Acme.....60	3	...	11x5x5 1/4	36x4	36x7	W	Corbitt.....AA-22	5	4500	4 x6 1/2	36x6	40x6d	W	Graham Bros.....	1 1/2	1325	33x4x4 1/2	33x5n	33x5n	B		
Acme.....60L	3	...	11x5x5 1/2	36x4	36x7k	W	Grimm-Pion. 10	...						Grimm-Pion. 10	...							
Acme.....90	4 1/2	...	11x5x5 1/2	36x5	40x10	W	Grimm-Pion. 15	1 1/2-2						Grimm-Pion. 15	1 1/2-2	1750a	33x4x5	36x3 1/2	36x5k	I		
Acme.....125	6 1/4	...	13x4x6	35x6	40x12	W	Grimm-Pion. 65	1 1/2-2						Grimm-Pion. 65	1 1/2-2	2250a	33x4x5	36x3 1/2	36x5	W		
American.....25	2 1/2	3350	4 x6	36x1k	36x10k	W	Grimm-Pion. 20	2-2 1/2						Grimm-Pion. 20	2-2 1/2	2475a	41x6x5 1/4	36x4k	36x7k	WW		
American.....40	4	4275	11x6x6	31x5k	36x10k	W	Grimm-Pion. 30	3						Grimm-Pion. 30	3	3300a	41x4x5 1/2	36x5k	36x5k	WW		
American.....50	5	4500	11x6x6	31x5k	36x12	W	Grimm-Pion. 75P	3 1/2						Grimm-Pion. 75P	3 1/2	4225a	41x2x5 1/2	36x6n	42x9n	WW		
Armleder.....1	...	33x5 1/4	31x3 1/2	31x5	W	Grimm-Pion. 40	4 1/2						Grimm-Pion. 40	4 1/2	3850a	41x2x5 1/2	36x5	36x5dk	W			
Armleder.....2	...	33x5 1/4	31x3 1/2	31x5	W	Grimm-Pion. 50	5-6						Grimm-Pion. 50	5-6	4450a	19x4x6	36x6	40x6d	W			
Armleder.....40-B	1 1/2	...	11x5x5 1/4	31x3 1/2	31x5k	W	Hall.....	1 1/2						Hall.....	1 1/2	3100	33x4x5	34x5n	38x7n	W		
Armleder.....40-C	1 1/2	...	11x5x5 1/4	31x3 1/2	31x5k	W	Hall.....	2 1/2						Hall.....	2 1/2	3275	41x8x5 1/4	36x4	36x6	W		
Armleder.....HW-B	2 1/2	...	11x5x5 1/4	31x3 1/2	31x5k	W	Hall.....	D	2	2400	11x5x5 1/4	36x4	36x7	W	Hall.....	3 1/2	4100	11x2x5 1/2	36x5	36x5d	W	
Armleder.....HW-C	2 1/2	...	11x5x5 1/4	31x3 1/2	31x5k	W	Hall.....	E	5	2750	11x5x5 1/4	36x4	36x7	W	Hall.....	5	5100	11x2x5 1/2	36x5	40x6d	W	
Armleder.....K.W-B	3 1/2	...	11x5x5 1/4	31x3 1/2	31x5k	W	Hall.....	F	3120	11x5x5 1/2	36x5	36x5d	W	Hall.....	7 chain	7	5100	11x2x5 1/2	36x5	40x6d	C	
Armleder.....K.W-C	3 1/2	...	11x5x5 1/4	31x3 1/2	31x5k	W	Hall.....	G	3200	11x5x5 1/2	36x5	36x5d	W	Hall.....	W.A.O.	2	2650	11x4x5 1/2	34x4	34x7	W	
*Atlas.....22	1	1495	33x5x5 1/4	31x3 1/2	31x4 1/2	W	Hall.....	H.W.F.A.	2 1/2	2950	11x5x5 1/2	36x4	36x7	W	Hall.....	W.H.A.	3 1/2	3950	11x2x6	36x5	36x5d	W
*Atlas.....22D	1	1495	33x5x5 1/4	31x3 1/2	31x4 1/2	W	Hall.....	O	4	4295	11x5x5 1/2	36x5	36x10	W	Hawkeye.....	0	1375	39x8x5 1/2	34x5n	34x5n	I	
Atterbury.....8E	5	4975	11x5x5 1/4	31x3 1/2	31x4 1/2	W	Hall.....	K	1	1600	33x5 1/4	34x5	34x5	W	Hawkeye.....K	1 1/2	1615	33x4x5 1/2	34x3 1/2	34x5k	I	
Atterbury.....8E	5	5125	13x4x6	36x5	40x6	W	Hall.....	L	2	2350	33x5 1/4	34x3 1/2	34x5	W	Hawkeye.....L	2	2145	11x4x5	36x4k	36x6k	I	
Autocar.....21U	11 1/2-2	1950	33x5x5 1/4	36x6n	36x6	W	Hall.....	M	2	2650	33x5 1/4	34x5	34x5	W	Hawkeye.....M	2	3700	11x2x6 1/2	36x5k	36x10k	I	
Autocar.....21U	11 1/2-2	2050	13x4x5 1/2	31x4k	31x6	W	Hall.....	N	3 1/2	2950	11x5x5 1/2	36x4	36x7	W	Hendrickson.....O	1 1/2	2200	39x8x5 1/2	36x4n	36x5n	W	
Autocar.....27H	2-3	2950	1 x5 1/2	31x4k	31x6	W	Hall.....	O	4	3150	11x5x5 1/2	36x5	36x4n	W	Hendrickson.....N	2 1/2	2690	11x4x5 1/2	36x4k	36x7k	W	
Autocar.....27K	2-3	3075	1 x5 1/2	31x4k	31x6	W	Hall.....	P	5	3250	11x5x5 1/2	36x5	36x4n	W	Hendrickson.....M	3 1/2	3000	11x4x5	36x5k	36x5dk	W	
Autocar.....26-B	4-6	4100	11x5x5 1/2	31x4k	31x6	W	Hall.....	R	5	4325	11x5x5 1/2	36x5	36x6	W	Hendrickson.....K	5	4000	5 x6 1/2	36x6	40x6	W	
Autocar.....26-B	4-6	4100	11x5x5 1/2	31x4k	31x6	W	Hall.....	SD	6	4325	11x5x5 1/2	36x5	36x6	W	Huffman.....B	1 1/2-2	1795	39x4x5	34x3 1/2	34x6	W	
Available.....H1	1 1/2	2475	1 x5	30x3 1/2	30x5k	W	Hall.....	T	7	4100b	41x4x5 1/2	36x5	36x7	W	Huffman.....C	2-3	1695	11x4x5 1/2	36x3 1/2	36x6	W	
Available.....H2	2	2775	1 x5	30x3 1/2	30x6k	W	Hall.....	W	8	5100	5100	33x5 1/2	36x5	36x7	W	Hurlburt.....A-A	1 1/2-1	1950	33x4x5	34x5n	34x5n	W
Available.....H2	2 1/2	3160	1 x5	30x4k	30x8k	W	Hall.....	W-B	9	5100	5100	33x5 1/2	36x5	36x4d	W	Hurlburt.....B-B	2-2 1/2	2800	11x4x5 1/2	36x4	36x4d	W
Available.....H3	3 1/2	4175	11x2x5 1/2	36x5	40x5d	W	Hall.....	C-C	10	5100	5100	33x5 1/2	36x5	36x5d	W	Hurlburt.....C-C	3 1/2	3475	11x4x5 1/2	36x5	36x6d	W
Available.....H5	5	5375	5 x6	36x6	40x12	W	Hall.....	D-D	11	5100	5100	33x5 1/2	36x6	36x6d	W	Hurlburt.....D-D	4 1/2	4150	11x4x5 1/2	36x6	36x6d	W
*Avery.....1	1	...	3 x13	31x5n	31x6n	W	Hall.....	E-E	12	5100	5100	33x5 1/2	36x6	36x6d	W	Hurlburt.....E-E	5 1/2	4850	11x4x6 1/2	36x6	40x6d	W
Beck.....A Jr.	1 1/4	1285a	31x2x5	34x4 1/2n	34x4 1/2n	I	Holep'dt (Iowa).....B	1						Holep'dt (Iowa).....B	1	1365	31x2x5	34x3 1/2	34x4	I		
Beck.....B-30	1 1/2	1350	31x4x5	11x5	36x6	I	Holep'dt (Iowa).....G	1 1/2						Holep'dt (Iowa).....G	1 1/2	2010	33x4x5 1/2	34x3 1/2	34x5	I		
Beck.....C-40	2	1550	33x4x5	11x5	36x6	I	Holep'dt (Iowa).....H-I	2 1/2						Holep'dt (Iowa).....H-I	2 1/2	2940	11x5x5 1/2	36x7	36x7	I		
Beck.....D-50	2 1/2	1950	11x5x5 1/4	38x7	40x8	I	Holep'dt (Iowa).....I	10						Holep'dt (Iowa).....I	10	1	...	...	...	B
Bell.....M (Iowa)	1	1495	33x5x5 1/4	35x5	35x5n	W	Holep'dt (Iowa).....J	22						Holep'dt (Iowa).....J	22	1590	31x2x5	34x3 1/2	34x5	I		
Bell.....E (Iowa)	1 1/2	2100	33x5x5 1/4	31x3 1/2	31x5	I																

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive			
			Front	Rear					Front	Rear						Front	Rear			
Kleiber.....BB	2	\$3600	4½x5½	36x4k	36x7k	W	Ogden.....D	1½	....	3¾x5	36x3½	36x5	W	Selden.....70	3½-5	\$3750	4½x5½	36x5	36x10 W
Kleiber.....B	2½	3950	4½x5½	36x5k	36x8	W	Ogden.....E	2½	....	4½x5½	36x4	36x8	W	Selden.....90	5-7	4950	4½x5	36x6	40x12 B
Kleiber.....C	3½	4600	4½x5½	36x5	36x5d	W	Old Hickory.....W	1	\$1775	3¾x5	36x3½	36x4k	W	Seneca.....M	1½	820	3½x4½	30x3½	30x3½ B	
Kleiber.....D	5	5300	5 x6½	36x6	40x12	W	Old Reliable.....A	1½	2350	4 x5	34x4	36x6	W	*Service.....12	2	....	3½x4½	32x4½	32x4½ B
Koehler.....D	1½	2150	3½x2½	34x3½	34x5	W	Old Reliable.....B	2½	3500	4½x6	34x4	36x4d	W	*Service.....25	1½	....	3½x5½	34x5	34x5 C
Koehler.....M	2½	3175	4 x5½	36x4	36x7	W	Old Reliable.....C	3½	4250	4½x6	36x5	36x5d	W	*Service.....21	1½	....	3½x5½	34x3½	34x5 W
Koehler.....MC	2½	3275	4 x5½	36x4	36x7	W	Old Reliable.....D	5	5000	4½x6	36x6	40x6d	C	*Service.....37	2	....	4 x5½	35x5	38x7 W
Koehler.....F	3½	4470	4½x5½	36x5	36x10	W	*Oldsmobile Econ	7	6000	4½x6	36x6	40x7d	C	*Service.....52	3	....	1½x5½	36x4	36x8 W
Koehler, MT. Trac	5	3275	4 x5½	36x4	36x7	W	Olympic.....A	2½	1095	3½x5½	35x5n	35x5n	I	*Service.....72	3½	....	4½x5½	36x5	36x5d W
Krebs.....23	¾	1360	3¾x4½	34x4½	34x4½	B	Oneida.....B	2½	3200	4½x5½	36x4	36x8	W	*Service.....77	4	....	1½x5½	36x3	36x5d W
Krebs.....24	1	1675	3½x4½	34x5	34x5	W	Oneida.....B	1½	2825	4 x5½	36x3½	36x7	W	Service.....102	6	....	1½x5½	36x6	40x6d W
Krebs.....45	1½	2150	4½x5½	36x4	36x7	W	Oneida.....C	2½	3200	4 x5½	36x5	36x8	W	Signal.....NF	1	1450	3½x5½	34x5	36x6 W	
Krebs.....75	2½	2550	4½x5½	36x4	36x8	W	Oneida.....D	3½	4050	4½x5½	36x5	36x10	B	Signal.....J	2½	2375	4½x5½	34x4	36x8 W	
Krebs.....110	3½	3175	4½x5½	36x5	40x10	W	Oneida.....E	5	4725	4½x5½	36x6	40x12	B	Signal.....M	3½	3175	4½x5½	36x5	40x5d W	
Krebs.....140	5	....	4½x6	36x6	40x6d	W	Oshkosh.....A	2	2485	3½x5½	36x6n	36x8n	B	Signal.....R	5	3900	1½x5½	36x6	40x6d W
Larrabee.....X-2	1	1925	3½x4½	34x5n	34x5n	B	Oshkosh.....BB	2½	3585	4 x5½	38x7n	38x7n	B	*Standard.....75	1½	1330	3½x5½	33x5n	33x5n W	
Larrabee.....U	1½	2400	3½x5	34x3½	34x5	W	*Overland	4	425	3½x5½	30x3½	30x3½	B	Standard.....1-K	1½	1600	3½x5	34x3½	34x5 W	
Larrabee.....J	1½-2½	2400	3½x5	34x3½	34x5	W	Packard.....EC	2-3	3100	4½x5½	36x4	36x7	W	Standard.....76	2½-3	2400	1½x5½	36x4	36x8 W	
Larrabee.....K	2½-3	3100	4½x5½	36x4	36x7	W	Packard.....EX	2-2½	3100	4½x5½	36x6n	40x8n	W	Standard.....66	3½-4	3150	4½x5½	36x5	36x12 C	
Larrabee.....K-5	2½-3	3450	4½x5½	36x4	36x8	W	Packard.....EF	5-7½	4500	5 x5½	36x6	40x6d	W	Standard.....5-K	5-7	4400	1½x5½	36x6	40x14 W	
Larrabee.....L	3½-6	4000	4½x5½	36x5	36x5d	W	Packard.....M	20	4850	5 x6	36x6	40x6d	W	*Star.....Utility	1½	6100	3½x5½	30x3½	30x3½ W	
Maccar.....L	1½	....	4½x5½	36x4	36x6	W	Packard.....P	20	3950	4½x6	36x5	40x5d	W	Sterling.....H	1½	2885	1 x5½	36x3½	36x5d W
Maccar.....H-A	2	....	4½x5½	36x4	36x4d	W	Paike.....52-19	1½	1950	4 x5½	34x3½	34x5	W	Sterling.....Z	2	3085	4 x5½	36x4	36x6d W
Maccar.....H	2	....	4½x5½	36x4	36x5d	W	Paike.....52-20	2½	2420	4½x5½	34x4	34x8	W	Sterling.....W	5	4930	5 x6½	36x6	40x6d C
Maccar.....M-3	4	....	4½x5½	36x5	36x6d	W	Parker.....51-18	3½	3145	1½x5½	36x5	36x5d	W	Sterling.....S	5	5500	5 x6½	36x6	40x6d C
Maccar.....G	5-6	4840	4½x6	36x4	40x6d	W	Parker.....C-22	1	1875	3½x5½	31x5n	31x5n	W	Sterling.....T	7½	712	6000	5 x6½	36x6	40x7d C
MacDonald.....A	7½	5750	4½x6	10x7	40x14	I	Parker.....G-22	2½	3200	4 x5½	34x4	36x4d	W	*Stewart.....Utility	4-11	1245	3½x5½	34x4½	34x4½ W	
Mack.....AB.D.	1½	3450	4 x5	36x4	36x3½	D	Parker.....J-20	3½	3950	4½x6	36x5	40x5d	W	Stewart.....15	1½-1	1415	3½x5½	35x5n	35x5n W	
Mack.....AB Chain	1½	3000	4 x5	36x4	36x3½	D	Parker.....M-20	5	4850	5 x6	36x6	40x6d	W	Stewart.....9	1½-2	1790	3½x5	34x3½	34x6 W	
Mack.....AB Chain	2	3300	4½x5	36x4	36x4d	C	Patriot.....Revere	1	1380	3½x5	35x5n	35x5n	W	Stewart.....7-X	2½-3	2310	4½x5½	34x8	34x8 W	
Mack.....AB.D.	2	3750	4½x5	36x4	36x4d	D	Patriot.....Lincoln	2	2050	1½x5½	34x4	34x6	W	Stewart.....10-X	3½-4	3190	4½x6	36x5	36x10 W	
Mack.....AB Chain	2½	3850	4½x5	36x4	36x4d	D	Patriot.....LS-800	2	2175	4 x5½	34x4	36x4d	W	*Stewart.....C	1½	1245	3½x5½	34x4½	34x4½ W	
Mack.....AC Chain	3½	3400	4½x5	36x4	36x4d	C	Patriot.....Washgt'n	3	2900	4½x5½	36x5	36x7	W	Stoughton.....C	¾	1095	3½x5	34x4½	34x4½ W	
Mack.....AC Chain	3½	4950	5 x6	36x5	40x5d	C	Pierce-Arrow.....2	2	3200	1½x5½	36x4	36x4d	W	Stoughton.....A	1	1790	3½x5½	34x5n	34x5n W	
Mack.....AC Chain	5	5500	5 x6	36x6	40x6d	W	Pierce-Arrow.....3½	2	4350	4½x6	36x5	36x5d	W	Stoughton.....B	1½	2150	3½x5½	36x3½	36x5 W	
Mack.....AC Chain	6½	5750	5 x6	36x6	40x12	C	Pierce-Arrow.....5	2	4850	1½x6	36x6	40x6d	W	Stoughton.....D	2	2490	1 x5½	36x4	36x7 W	
Mack.....AC Chain	7½	6000	5 x6	36x7	40x7d	C	Pittsburgh.....1½-2	2	3000	3½x5	36x4	36x6	W	Stoughton.....E	3	3150	4½x5½	36x5d	36x5d W	
Mack.....Trac.	AB	5	3400	4½x5	36x4	36x4d	C	Pittsburgh.....3	2	3800	4½x5½	36x5	36x7	W	Sullivan.....E	2	2800	4½x5½	36x4	36x7k W
Mack.....Trac.	AC	7	4050	5 x6	36x5	40x5d	C	Power.....F	2	3150	1 x5½	36x5	36x7	W	Sullivan.....H	3½	3750	4½x6	36x5	36x5d W
Mack.....Trac.	AC	10	5500	5 x6	36x6	40x6d	C	Premocar.....B-143	1½	2475	3½x5½	36x6n	36x6n	W						
Mack.....Trac.	AC	13	5750	6 x6	36x7	40x12	C													
Mack.....AC Trac.	AC	15	6000	5 x6	36x7	40x7d	C													
*Mapleleaf.....**	1½	3000	3½x5½	34x5n	36x6n	W														
Mapleleaf.....AA	2½	3600	4 x5½	36x4	36x7	W														
Mapleleaf.....BB	3	4050	4½x5½	36x4	36x4d	W														
Mapleleaf.....CC	4	4800	4½x5½	36x5	36x5d	W														
Mapleleaf.....DD	5	5625	4½x5½	36x6	40x6d	W														
Mason.....1	1	1200	4 x5	34x5n	31x5n	B														
Master.....JW	1½	2290	4½x5½	34x3½	34x5	W														
Master.....JD	1½	2590	4½x5½	34x3½	31x6	W														
Master.....Z	2	2290	4½x5½	34x3½	31x5	W														
Master.....W	2½	2890	4½x5½	34x4	36x8	W														
Master.....DD	2½	3190	4½x5½	34x4	36x7	D														
Master.....A	3½	3192	4½x5½	34x6	36x5	W														
Master.....E	3½	4290	4½x6	36x5	40x5d	W														
Master.....F	5	4490	4½x6½	36x5	36x6	D														
Master.....F	5	5090	4½x6½	36x6	40x6d	D														
Master.....Trac., DDT	6	3300	4½x5½	34x4	36x7	W														
*Maxwell.....1½	1½	932	3½x4½	32x3n	32x4n	W														
*Menominee.....HT	1-1½	1650	4 x5	31x5n	34x5n	W														
Menominee.....H	1½	2475	4 x5	36x3½	36x5	W														
Menominee.....D-2½	2½	2875	4 x6	36x4	36x8	W														
Menominee.....G	3½	3800	4½x6	36x5	36x10	W														
Menominee.....J-3	5	4250	4½x6	36x6	40x12	W			</td											

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive
				Front	Rear						Front	Rear						Front	Rear	
Veteran... P** 2	\$3699	4 $\frac{1}{4}$ x 5 $\frac{1}{2}$	36x4	36x7	W		White... 40	3 $\frac{1}{2}$	\$4200	3 $\frac{3}{4}$ x 5 $\frac{1}{2}$	36x5	40x5d	D	Wichita... O	4	\$3500	4 $\frac{1}{2}$ x 6 $\frac{1}{4}$	36x5k	36x5k	W
Veteran... R** 3	4200	4 $\frac{1}{4}$ x 5 $\frac{1}{2}$	36x4	36x7			White... 45	5	4500	4 $\frac{1}{4}$ x 5 $\frac{1}{2}$	36x6	40x6d		Wilcox... AA	1	1900	3 $\frac{3}{4}$ x 5 $\frac{1}{2}$	36x4k	36x4k	W
Veteran... S** 4	5395	4 $\frac{1}{2}$ x 6	36x5	36x10	W		White Hick... E	1	1225	3 $\frac{3}{4}$ x 5	31x5	34x5	W	Wilcox... BB	1 $\frac{1}{2}$	2550	4 $\frac{1}{4}$ x 5	36x4	36x5	W
*Vim... 50 $\frac{1}{2}$ - $\frac{3}{4}$	995	4 x 5	32x4n	32x4n	B		White Hick... H	1 $\frac{1}{2}$	1375	3 $\frac{3}{4}$ x 5	36x3 $\frac{1}{2}$	36x5	W	Wilcox... D	2 $\frac{1}{2}$	3000	4 $\frac{1}{4}$ x 5	36x4k	36x3 $\frac{1}{2}$ dk	W
							White Hick... K	2 $\frac{1}{2}$	1675	4 $\frac{1}{4}$ x 5 $\frac{1}{2}$	36x4	36x5	W	Wilcox... E	3 $\frac{1}{2}$	3950	4 $\frac{1}{2}$ x 6	36x5k	36x5dk	W
Walker-Johnson A	2500	3 $\frac{3}{4}$ x 5	34x3 $\frac{1}{2}$	34x6	W		Wichita... K	1	1875	3 $\frac{3}{4}$ x 5 $\frac{1}{2}$	36x4	36x4k	W	Wilcox... F	5	4350	4 $\frac{1}{4}$ x 6 $\frac{1}{2}$	36x5	40x6d	W
Walker-Johnson B	3000	4 $\frac{1}{4}$ x 5 $\frac{1}{2}$	36x4	36x8			Wichita... M	2	2400	3 $\frac{3}{4}$ x 5 $\frac{1}{2}$	36x3 $\frac{1}{2}$	36x6k	W	Wilson... EA	2 $\frac{1}{2}$	2825	4 $\frac{1}{4}$ x 5 $\frac{1}{2}$	36x4	36x7	W
Walker... M	3850	4 $\frac{1}{4}$ x 5 $\frac{1}{2}$	36x4	36x8	D		Wichita... RX	3	3200	4 $\frac{1}{4}$ x 5 $\frac{1}{2}$	36x4k	36x8k	W	Wilson... G	3 $\frac{1}{2}$	3085	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x5	36x5	W
Walker... S	4850	4 $\frac{1}{2}$ x 6 $\frac{1}{2}$	36x6	40x6d	W									Wilson... H	5	4520	4 $\frac{1}{2}$ x 6	36x6	40x6	
*Watson... C	1465a	3 $\frac{3}{4}$ x 5 $\frac{1}{2}$	35x5m	35x5n										*Wisconsin... A	1	1750	3 $\frac{3}{4}$ x 5	34x5n	34x5n	WB
Watson... N	3 $\frac{1}{2}$	4250	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x5	36x10	W								Wisconsin... B	1 $\frac{1}{2}$	2100	3 $\frac{3}{4}$ x 5	35x5	36x6	W
Western... W1 $\frac{1}{2}$	2450	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x3	36x5k	W									Wisconsin... C	2 $\frac{1}{2}$	2700	4 x 5 $\frac{1}{2}$	36x6n	36x7	W
Western... L1 $\frac{1}{2}$	2450	3 $\frac{3}{4}$ x 5	36x3	36x5k	W									Wisconsin... D	3 $\frac{1}{2}$	3000	4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	36x6n	40x8	W
Western... W2 $\frac{1}{2}$	3250	4 $\frac{1}{4}$ x 5 $\frac{1}{2}$	36x4	36x7	W									Wisconsin... E	5	3500	4 $\frac{1}{2}$ x 6 $\frac{1}{2}$	36x6	36x10	W
Western... L2 $\frac{1}{2}$	2450	4 $\frac{1}{4}$ x 6	36x4	36x7	W									Wisconsin... F	7	4000	5 x 6 $\frac{1}{4}$	36x6	36x12	W
Western... W3 $\frac{1}{2}$	4000	4 $\frac{1}{4}$ x 6	36x5	40x5d	W									Witt-Will... N	1 $\frac{1}{2}$	2450	3 $\frac{3}{4}$ x 5	36x3 $\frac{1}{2}$ k	36x6k	W
*White... 15 $\frac{3}{4}$	2400	3 $\frac{3}{4}$ x 5 $\frac{1}{2}$	34x5n	34x8n	B									Witt-Will... P	2 $\frac{1}{2}$	2900	4 $\frac{1}{4}$ x 5 $\frac{1}{2}$	36x4k	36x8k	W
White... 20	3250	3 $\frac{3}{4}$ x 5 $\frac{1}{2}$	36x4k	36x7k	D															

FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm.

r—8 cyl. s—6 cyl. t—2 cyl.—all others are 4 cyl. d—dual tires, k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. *—express truck or delivery wagon. **—Canadian Make. trac.—tractor.

Specifications of Current Farm Tractor Models

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders; Bore, Stroke	Fuel	Plow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders; Bore, Stroke	Fuel	Plow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders; Bore, Stroke	Fuel	Plow Capacity
Allis-Chalm.G.P.	6-12	\$250	2	Le.R.	4-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	Gas.	1	Frick... A	12-20	...	4	Erd.	4-4 x 6	G.K.	2-3	OilPull... E	30-60	...	4	Own	2-10x12	K,D	8-10
Allis-Chalm.	15-25	1185	4 Midw.	4 $\frac{1}{4}$ x 5 $\frac{1}{2}$	Gas.	3	Frick... C	15-28	...	4	Beav.	4-4 $\frac{1}{4}$ x 6	G.K.	3-4	Oldsmar... K	2 $\frac{1}{2}$ -5	\$225	4	Own	1-5 $\frac{1}{2}$ x 5 $\frac{1}{2}$	Gas.	1	
Allis-Chalm.	20-35	1885	4 Own	4 $\frac{1}{4}$ x 6 $\frac{1}{2}$	GorK	3-4										Pioneer... G	18-36	...	4	Own	4-5 $\frac{1}{2}$ x 6	G,K,D	4
Allis-Chalm.	20-35	2085	4 Own	4 $\frac{1}{4}$ x 6 $\frac{1}{2}$	G	4										Pioneer... C	40-75	...	4	Own	4-7 x 8	Gas.	10
Allwork... 2-G	14-28	1595	4 Own	4-4 x 6	GorK	3										Russell... 12-24	1500	4	Own	4-4 $\frac{1}{4}$ x 5 $\frac{1}{2}$	GorK	2-3	
Allwork... C	14-28	1395	4 Own	4-5 x 6	GorK	3									Russell... 15-30	2200	4	Own	4-5 x 6 $\frac{1}{2}$	GorK	3-4		
AERO-1921-22	3-6	385	4 Own	1-4 $\frac{1}{2}$ x 2 $\frac{1}{2}$	Gas.	1									Russell... 20-35	3000	4	Own	4-5 $\frac{1}{2}$ x 7	GorK	4-5		
Aultman-T.	15-30	1900	4 Clim.	4-5 x 6 $\frac{1}{2}$	G.K.D.	4									Russell... 30-60	5000	4	Own	4-8 x 10	GorK	8-10		
Aultman-T.	22-45	2800	4 Own	4-5 $\frac{1}{2}$ x 8	G.K.D.	6									Samson... M	....	445	4	Own	4-4 x 5 $\frac{1}{2}$	G,K	2
Automot... B-3	12-24	1250	4 Here	4-4 x 5 $\frac{1}{2}$	Gas.	2-3									ToroCultivator	6	750	3	Le.R.	4-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	Gas.	2	
Avery, SR, Cul-C	5-10	4 Own	4-3 x 4	G,K	..										ToroTractor'22	6-10	495	3	Le.R.	4-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	Gas.	2	
Avery... C	5-10	3 Own	6-3 x 4	G,K	2										Townsend	10-20	800	2	Own	4-6 $\frac{1}{2}$ x 7	Ker.	2-3	
Avery... C	5-10	4 Own	4-3 x 4	G,K	..										Townsend	15-30	1350	2	Own	4-7 x 8	Ker.	3-4	
Avery... C	8-16	4 Own	2-5 $\frac{1}{2}$ x 6	G,K,D	2-3										Townsend	25-50	2500	2	Own	4-8 $\frac{1}{2}$ x 10	Ker.	4-8	
Avery... C	12-20	....	4 Own	4-4 x 6	G,K,D	2-3									TractorMotor	40-50	....	4	...	8-3 $\frac{1}{2}$ x 5	Gas.	4-5
Avery... C	12-25	4 Own	2-6 $\frac{1}{2}$ x 7	G,K,D	3-4										Traylor... TB	6-12	500	4	Le.R.	4-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	Gas.	1-2	
Avery... C	14-28	4 Own	4-4 $\frac{1}{2}$ x 7	G,K,D	3-4										Trundaar... 10	25-40	3750	2	Wauk.	4-6 x 6 $\frac{1}{2}$	GorK	4	
Avery... C	18-36	4 Own	4-5 $\frac{1}{2}$ x 6	G,K,D	4-5										TwinCity... 12-20	12-20	1200	4	Own	4-4 x 6	H,K	3	
Avery... C	25-50	4 Own	4-6 $\frac{1}{2}$ x 7	G,K,D	5-6										TwinCity... 20-35	2750	4	Own	4-5 $\frac{1}{2}$ x 6 $\frac{1}{2}$	G,K	5-6		
Avery... C	45-65	4 Own	4-7 $\frac{1}{2}$ x 8	G,K,D	8-10										TwinCity... 40-65	4750	4	Own	4-7 $\frac{1}{2}$ x 9	G,K	8-10		
Bates Mule, H	15-25	....	4 Midw.	4-4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	Gas.	3									Uncle SamC20	12-20	1295	4	Weid.	4-4 x 5 $\frac{1}{2}$	G	2-3
Bates Mule, F	18-25	....	2 Midw.	4-4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	Gas.	3									Uncle SamB19	20-30	1985	4	Beav.	4-4 $\frac{1}{2}$ x 6	GorK	3-4
Bates Mule, G	25-35	....	2 Midw.	4-4 $\frac{1}{2}$ x 6	Gas.	4									Uncle SamD21	20-30	1985	4	Beav.	4-4 $\frac{1}{2}$ x 6	GorK	3-4
Bear... Bear...	25-35	4250	2 Ste.	4-4 $\frac{1}{2}$ x 6 $\frac{1}{2}$	Gas.	4									Utilit... 501	2 $\frac{1}{2}$ -4	295	4	Own	1-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	G	1	
Beeman Jr... B-4	3-4	180	2 B&S	1-2 $\frac{1}{2}$ x 2 $\frac{1}{2}$	Gas.	..									Utilit... 501A	2 $\frac{1}{2}$ -4	340	4	Own	1-3 $\frac{1}{2}$ x 4 $\frac{1}{2}$	G	1	
Best... Best...	2-4	240	4 Own	1-3 $\frac{1}{2}$ x 2 $\frac{1}{2}$	Gas.	4									Wallis... K	15-25	675	4	Own	4-4 $\frac{1}{2}$ x 5 $\frac{1}{2}$	G,K	3	
Best... Best...	30</																					

Specifications of Current Passenger Car Models

PRICES										NAME AND MODEL	Carburetor	Starting and Lighting	Ignition	Clutch; Type and Make	Gearset	Universal; Type and Make	Rear Axle Type and Make	Gear Ratios
2-Pass.	5-Pass.	7-Pass.	Sport	Coupe	Sedan	Wheel Base	Tires	Engine Make	Cylinders: Bore and Stroke									
.....	\$4500c	\$4500	\$6500	136	33x5	Cont.	6-3½x5½	31.51	Ambassador.....R	Strom.	West.	Bosch.	m-d B-L.	B-L.	f Norwalk.	F Tim... 4.45
\$1995c	1785	1850	\$1885c	2485	127	33x4½	H-S.	6-3½x5	29.49	American.....D-66	Strom.	G-D.	A-K.	s-p B&B.	B & B.	m Hartford.	F Salis... 4.50
1650	127	33x4	Own.	2-	None.	L-N.	L-N.	None.	None.	Own... 1.75	
1195	1495	1495	\$1450c	114	32x4	Cont.	6-3½x4½	23.44	American.....Steamer	West.	West.	Salis...
{1495	1495	1595	1595c	1995c	1995d	120	33x4	Cont.	6-3½x4½	27.34	Anderson.....Aluminum 6	Rayfield.	Remy.	s-p B&B.	s-p B&B.	Durston.	f Snead...	4F Salis... 4.50
{1785p	2620	2645	3625	3695	130	34x4½	Own.	8-3½x5	33.80	Anderson.....Series 40	
1575	1475	1545n	1995n	2275	2345	121	32x4	Cont.	6-3½x4½	27.34	Auburn.....5-51	Strom.	Remy.	s-p B&B.	s-p B&B.	G-L.	m Universal.	F Salis... 4.75
.....	1395	1850d	1850d	118	32x4	Cont.	6-3½x4½	23.44	Barley.....
1800	1800	2400	2500	121	32x4	Cont.	6-3½x4½	25.35	Bay State.....	Strom.	Col...	
2950	2950c	3950	3950	121	32x4	Buda.	4-3½x5½	22.50	Biddle.....B1 & B5	Zenith.	USL.	Simms.	s-p Warner.	Spicer...	2F Std... 4.50	
5000	5000	7000	7000	125	32x4½	Own.	4-4x5½	25.60	Brewster.....91	Zenith.	USL.	Own.	F Own...	Own...	3.92	
865	885	725g	1175	(1395	103	31x4	Own.	4-3½x4½	18.23	Buick.....1923-34-5-6-7-8	Marvel.	Delco.	m-d Own.	Own.	m Own.	4F Own... 4.66	
.....	1325	1325	118	33x4	Own.	6-3½x4½	27.34	Buick.....1923-41-4-5-7	Marvel.	Delco.	m-d Own.	Own.	m Own.	4F Own... 4.60	
1175	1195	975c	1935	1935	118	33x4	Own.	6-3½x4½	27.34	Buick.....1923-48-9-50-4-55	Marvel.	Delco.	m-d Own.	Own.	m Own.	4F Own... 4.90		
.....	1435	(1625a	1895	2195	124	34x4½	Own.	6-3½x4½	27.34	Cadillac.....61	Own.	Deleo.	Deleo.	m-d Own.	Own.	m Spicer.	F Tim... 4.50	
2885	2885	3675	(3950	132	33x5	Own.	8-3½x5½	31.25	Case.....	Rayfield.	Delco.	Delco.	m-d Own.	Own.	f Sneed...	2F Col... 5.25	
1750	1790	2480	2575	122	32x4½	Cont.	6-3½x4½	27.34	Case.....X	Rayfield.	Delco.	Delco.	m-d Own.	Own.	f Arva...	2F Col... 4.45		
1990	2250	2480	2975	129	34x4½	Cont.	6-3½x4½	31.54	Case.....W	Rayfield.	Delco.	Delco.	m-d Own.	Own.	f Adams...	2F Adams... 5.13		
1185	1185	1595	2295	117	32x4	Own.	6-3½x4½	25.35	Chalmers.....1922	Zenith.	Strom.	A-L.	.....	.....	.....	.....
1495	1495	1345	1585	122	32x4	Own.	6-3½x4½	25.35	Chalmers.....1922	Strom.	Delco.	Delco.	m-d Own.	Own.	f Hardy...	2F Adams... 5.13		
.....	1645	1595a	1995c	2295d	123	33x4	Own.	6-3½x4½	29.40	Chandler.....Six	Rayfield.	Bosch.	s-p B&B.	Own.	f Own.	4F Own... 4.45	
510	525	425g	860	860	102	30x3½	Own.	4-3½x4	21.53	Chevrolet.....Superior	Zenith.	A-L.	Remy.	e Own.	Own.	m Own.	4F Own... 3.66	
1085	995	1260	1295d	1495	112	32x4	Own.	6-3½x4½	22.50	Cleveland.....41	Zenith.	Bosch.	4F Tim... 4.45	
2685	2685	2685c	3285b	(3285c	127½	33x5	Nort.	8-3½x4½	39.20	Cole.....990	Johnson.	Deleo.	North.	m Mech.	4F Col... 4.46	
1475	1475	1475c	1925c	1995d	115	32x4	Cont.	6-3½x4½	27.34	Columbia.....Elite	Zenith.	Strom.	A-L.	A-K.	4F Tim... 4.46	
995	985	1395d	1395d	115	31x4	Cont.	6-3½x4½	23.41	Columbia.....Light Six	Zenith.	Strom.	A-L.	A-L.	.....	.....	4F Tim... 4.46
1395	1395	2065b	2165d	116	32x4	Falls.	6-3½x4½	23.41	Courier.....	Till.	Bijur.	A-K.	s-p B&B.	Norie.	Muncie.	4F Col... 5.00		
3000	3000	3000	4500	122½	32x4	Cont.	6-3½x5½	31.54	Crawford.....22-6-60	Zenith.	Bosch.	.....	.....	.....	.....	4F Tim... 4.46
.....	3500	.....	135	33x5	Cont.	6-3½x5½	31.54	Crawford-Dagmar.....6-60	Zenith.	Bosch.	.....	.....	.....	.....	4F Tim... 4.46	
4350b	4350c	4350	5250	6000	142	33x5	Own.	8-3½x5½	45.00	Cunningham.....V	Zenith.	Delco.	m-d Own.	Own.	f Sneed...	4F Tim... 4.23	
1195	1495	1795	17½	114	31x4	Cont.	6-3½x4½	23.41	Davis.....D-19	Zenith.	Delco.	.....	.....	.....	.....	4F Tim... 4.50
1595	1595	16½	2095	120	32x4	Cont.	6-3½x4½	27.31	Davis.....71	Zenith.	Delco.	.....	.....	.....	.....	4F Tim... 5.10
1175	1175	1295c	1215	112	32x4	H-S.	4-3½x5½	19.60	Dixie Flyer.....H-S-70	Zenith.	Delco.	.....	.....	.....	.....	4F Tim... 5.15
850	880	980b	1195d	114	32x4	Own.	4-3½x4½	24.03	Dodge Brothers.....	Eisemann.	Stewart.	N.E.	m-d Own.	Own.	f Peru...	4F Peru... 4.75		
3350c	3950c	3950	1985c	5750	132	33x5	Own.	6-3½x5	38.40	Doris.....6-80	Zenith.	Bosch.	.....	m Mech.	.....	4F Tim... 4.23
865	865	1015a	1240	1370	108	31x4	D-Ly.	4-3½x5½	19.60	Dort.....19-14	Zenith.	Carter.	m-d Detlaff.	Own.	m Mech...	4F Flint... 4.66	
990	990	1145	1195	115	31x4	Falls.	6-3½x4½	23.44	Dort.....25-20	Zenith.	Bosch.	.....	m-d Detlaff.	Own.	f Mech...	4F Flint... 4.66	
.....	1365	1495	1145	115	30x3½	Own.	4-2½x4½	11.03	Driggs.....	Bosch.	Bosch.	.....	.....	.....	.....	4F Tim... 4.75
1275	1275	1650	1975	101	30x3½	Own.	4-2½x4½	11.03	Duesenberg.....Straight 8	Zenith.	Deleo.	Hoos.	Mech.	.....	.....	4F Tim... 4.81
6500	6500	6750	7800	134	33x5	Own.	8-2½x5	26.45	DuPont.....A	Zenith.	Deleo.	.....	.....	.....	.....	4F Tim... 4.50
3000	3200	3800	4000	124	32x4½	Own.	4-3½x5½	24.81	Durant.....A-22	Till.	.....	.....	s-p Ansted.	Warner.	f Spicer...	4F Tim... 5.15
800	890	1365	1365	109	31x4	Cont.	4-3½x4½	24.03	Durant.....B-22	Rayfield.	.....	.....	m-f Spicer.	Warner.	f Spicer...	4F Tim... 4.30
1600	1650	2250	2400	123½	32x4½	Anst.	6-3½x4½	25.35	Hansel.....	Zenith.	Deleo.	.....	.....	.....	.....	4F Tim... 4.30
1485	1095	950g	1395c	1795	112	32x4	Own.	4-3½x5½	18.91	Earl.....40	Zenith.	Deleo.	Conn.	s-p B&B.	Own.	f Own...	4F Tim... 3.66	
1095	1095	1345	1345	118	33x4	Lyc.	4-3½x5½	19.60	Elcar.....K-4	Zenith.	Deleo.	.....	s-p B&B.	Muncie.	f Peters...	4F Salis... 4.50	
1395	1395	1395	1975	2085	118	33x4	Cont.	6-3½x4½	27.34	Elcar.....8-R	Zenith.	Deleo.	m-d Warner.	Warner.	4F Salis...	4.50	
1125c	1125	1165	1695	1695	118	33x4	Own.	6-3½x4½	23.44	Elgin.....K-1	Zenith.	West.	Wagner.	s-p B&B.	Mech.	4F Tim... 4.66		
.....	1045	1145	1895	1245k	108½	32x4	Own.	4-3½x5½	18.23	Essex.....	Zenith.	Bosch.	m-d Own.	Own.	f Spicer...	4F Own... 4.66	
269r	298s	235g	530	(595	100	30x3½	Own.	4-3½x4	22.50	Ford.....T	Zenith.	Bosch.	m-d Own.	Own.	4F Own... 3.63	
3900	3900	4900	4900	132	32x4½	Own.	6-3½x5	27.34	Fox.....7F	Zenith.	West.	Bosch.	m-d B-L.	B-L.	Spicer...	4F Tim... 4.45		
1900	1950	2750	2850	115	32x4	Own.	6-3½x4	25.35	Franklin.....10	Zenith.	West.	A-K.	s-p B&B.	Own.	4F Tim... 4.73			
965	965	1115k	1365d	112	32x4	Lyc.	4-3½x4½	21.76	Gardner.....T-R & G	Zenith.	West.	A-K.	s-p B&B.	Mech.	4F Tim... 4.80			
1385	1385	1895	1915	116	32x4	Own.	6-3½x4½	23.44	Grant.....	Zenith.	Strom.	.....	m Mech.	.....	4F Tim... 4.66	
490	490	760	760	100	30x3½	Own.	4-3½x4½	21.03	Gray.....	Zenith.	Strom.	West.	m-d Own.	Detroit.	4F Tim... 3.90			
2475	2475c	3250	3175	120	32x4½	Weid.	4-3½x5½	22.50	H.C.S.....Series 4	Zenith.	Delco.	.....	m-d B-L.	B-L.	Spicer...	4F Tim... 4.23	
.....	2650	3450	3450	125	32x4½	Own.	4-4½x4½	27.23	Handley-Knight.....	Zenith.	Delco.	.....	s-p B&B.	Warner.	4F Tim... 4.90		
995	995	2175c	2585	121	32x4	Cont.	6-3½x4½	25.35	Hanson.....30	Zenith.	Delco.	.....	.....	.....	.....	4F Tim... 4.90
1595	1595	1795	1950	115	32x4	H-S.	4-3½x4½	19.60	Hanson.....60	Zenith.	Delco.	.....	.....	.....	.....	4F Tim... 4.66
1345	1345	1315c	1950	115	32x4	Own.	4-3½x4½	27.31	Hathfield.....A-42	Zenith.	Delco.	.....	.....	.....	.....	4F Tim... 4.66
2395	2395	2700f	3350d	3675	132	33x5	Own.	6-3½x4½	29.40	Haynes.....125	Zenith.	King.	s-p Warner.	Own.	Universal...	4F Own... 4.60	
1515	1695	1895a	2075b	121	32x4½	Own.	6-3½x5½	29.40	Haynes.....55	Zenith.	King.	.....	s-p Warner.	Own.	Universal...	4F Own... 4.11	
.....	1950d	215p	(2695	112	31x4	Own.	6-3½x4½	25.35	Jackson.....638	Zenith.	Strom.	4F Tim... 4.45		
2500c	2500	3600f	3600f	126	34x4½	Own.												



S T A N D A R D O F T H E W O R L D

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Specifications of Current Passenger Car Models

PRICES								NAME AND MODEL	Carburetor	Starting and Lighting	Ignition	Clutch; Type and Make	Gearset	Universal Type and Make	Rear Axle Type and Make	Gear Ratios				
2-Pass.	5-Pass.	7-Pass.	Sport	Coupe	Sedan	Wheel Base	Tires													
23985	\$4090c	\$4090	.....	\$5500	\$5500	132	33x5	Own.	8-3½x5½	33.80	LaFayette.....	Johnson.	Delco.....	Own.....	m Own.....	F Own.....	4.58			
5500	5500	5500	.....	5500	5500	134	32x4½	Own.	6-3½x5½	33.75	Leach.....	Rayfield.	Delco.....	m-d	Own.....	f Tim.....	4.50			
1605	(1695)	(1795)	\$2045d	2345c	2545d	123	32x4½	Anst.	6-3½x4½	25.35	Lexington.....	Rayfield.	G-D.....	m-d Anstd.	Warner.....	f Snend.....	2½F Own.....	5.10		
1575	1395	.....	1575	(2085)	2245	117	32x4	Own.	6-3½x5	23.44	Liberty.....	Strom.	Wagner.	s-p B&B.	Detroit.	m Spicer.....	2½F Tim.....	4.80		
3800	3800c	3600	.....	4490d	4700d	136	33x5	Own.	8-3½x5	36.45	Lincoln.....	Strom.	Delco.....	m-d Own.....	Own.....	F Tim.....	4.58			
6800c	7600c	7600	.....	10500	11000	142	35x5	Own.	6-4½x5½	48.60	Locomobile.....	Strom.	Balk&B.	m-d Own.....	Own.....	F Own.....	3.50			
3985	3185c	3185	.....	3985	4385	136	32x4½	Own.	6-3½x5½	33.75	Marmion.....	Strom.	Delco.....	m-d Own.....	Own.....	f Spicer.....	2½F Own.....	3.75		
885	885	.....	1235	985	1335	109	31x4	Own.	4-3½x4½	21.03	Maxwell.....	Stewart.	A-L.	c Own.....	Own.....	2½F Own.....	4.56			
6300	6300c	6300	.....	7500	7500	140	33x5	Own.	6-4½x6	48.60	McFarlan.....	1922	Rayfield.	West.....	Splitdorf.	s-p B&B.	B-L.	m Peters.....	F Tim.....	3.50
3950	3950c	3950e	.....	4850	5250	132	32x4½	Own.	4-3½x6½	25.50	Mercer.....	Series 5	Balk&B.	West.....	Eisemann.	m-d Own.....	Own.....	F Own.....	3.87	
3750	3750	.....	5000	5000	132	32x4½	Own.	6-3½x5	33.75	Mercer.....	6	Strom.	Eisemann.	DeCo.	f Sneed.....	2½F	3.77			
1895	1895	.....	1895	1895	1895	119	32x4	Cont.	6-3½x4½	25.35	Merit.....	Strom.	DeCo.	Remy.	Muncie.	s-p B&B.	Muncie.	f Col.....	4.60	
1490b	1590	.....	1890c	2050c	2270d	120	32x4	Own.	6-3½x5	29.40	Mitchell.....	F-50	Strom.	Remy.	Own.	m Own.....	F Own.....	4.42		
950	950	.....	1600	1600	1600	127	32x4½	Own.	6-3½x5	29.40	Mitchell.....	F-50	Strom.	Remy.	Own.	m Own.....	F Own.....	4.42		
1295	1195	p1445d	1885c	1585c	1695	115	31x4	Cont.	6-3½x4½	23.44	Monroe.....	1922-S-9	Zenith.	Conn.	m-d Own.....	Mech.	m Universal.	2½F Own.....	5.30	
1785	1785	1885	2785	(2785)	285	128	33x4½	Cont.	6-3½x4½	27.34	Moon.....	6-40	Strom.	Delco.	Warner.	m Spicer.....	2½F Tim.....	4.80		
1210	1240	.....	1395c	2040d	121	33x4	Own.	6-3½x5	25.35	Nash.....	691-96-97	Marvel.	DeCo.	DeCo.	s-p B&B.	Own.....	1½F Own.....	4.50		
915	935	1390	1645	1890c	2190f	127	34x4½	Own.	6-3½x5	25.35	Nash.....	692-94-97	Marvel.	DeCo.	DeCo.	s-p B&B.	Own.....	1½F Own.....	4.50	
2475b	2475c	2375	.....	3250c	3825f	130	32x4½	Own.	6-3½x5½	29.40	National.....	BB	Rayfield.	West.....	Delco.	s-p B&B.	B-L.	m Arvac.	F Col.....	4.08
2500	2500c	2600c	.....	3500d	128	32x4½	Cont.	6-3½x4½	25.35	Noma.....	3C	Claudel.	DeCo.	DeCo.	s-p B&B.	Detroit.	m Spicer.....	1½F Tim.....	4.45	
2500	2500	.....	5500	5500	128	33x5	Bea.	6-3½x5½	29.40	Noma.....	1D	Zenith.	DeCo.	DeCo.	s-p B&B.	Detroit.	f Spicer.....	1½F Tim.....	4.45	
1035	1035	1165c	1165	1165	1165	100	32x3½	Lyc.	4-3½x5	19.60	Norwalk.....	430-K	Zenith.	Dyneto.	DeCo.	s-p B&B.	Col.	m Universal.	2½F Col.....	5.00
975	995	795g	1165c	1445d	1545	115	32x4	Own.	6-2½x4½	18.99	Oakland.....	6-44	Marvel.	Remy.	Own.	m Mech.	Muncie.	F Own.....	4.33	
3750c	3750	3850	3750c	4500c	4800f	134	33x5	Cont.	6-3½x5½	31.51	Ogren.....	6 T D Luxe	Rayfield.	Bosch.	Bosch.	m-d B-L.	B-L.	m	F Col.....	4.00
955	975	1350d	1075	1475	1595	115	32x4	Own.	4-3½x5½	21.86	Odsomobile.....	43 A	Zenith.	•	Remy.	+p B&B.	Warner.	m Own.....	2½F Own.....	4.33
1735c	1850c	1735	.....	122	33x4½	Own.	8-2½x4½	26.45	Odsomobile.....	46	Balk&B.	DeCo.	c Own.	m Own.....	2½F Own.....	4.93				
1625p	1375	.....	1675	1875	2025	115	32x4	Own.	8-2½x4½	45	Odsomobile.....	47	Johnson.	DeCo.	DeCo.	s-p B&B.	Warner.	m Spicer.....	5.10	
525	525	425g	425g	795	875	100	30x3½	Own.	4-3½x4	18.23	Overland.....	4	Till.	Conn.	Conn.	s-p B&B.	Own.	1½F Own.....	4.50	
2485	2485	2250g	3175	3275	126	33x4½	Own.	6-3½x5	27.31	Packard.....	Single-Six	Own.	A-K.	DeCo.	m-d Own.	Own.	f Spicer.	1½F Own.....	4.60	
3850	3850	3850	.....	3525	5240	136	35x5	Own.	12-3x5	43.20	Packard.....	Single-Six	Own.	A-K.	DeCo.	m-d Own.	Own.	f Spicer.	1½F Own.....	4.36
1165	1465	1290g	1905	2245	119	32x4	Own.	6-3½x5	25.35	Paige.....	6-41	Strom.	Remy.	DeCo.	s-p B&B.	Long.	m Universal.	1½F Salis.....	4.75	
2495b	2495	2195	2245	3100	3155	131	33x4½	Cont.	6-3½x5	33.75	Paige.....	6-66	Rayfield.	Remy.	DeCo.	s-p B&B.	Warner.	m Meen.	3½F Tim.....	4.60
3300	2990c	2990	.....	3300d	3990d	128	33x5	Own.	8-3½x5	33.80	Paterson.....	22-6-52	Strom.	DeCo.	DeCo.	m-d Own.	Bald&B.	Durston.	1½F Std.....	4.50
5250	5250c	6800	6800	6800	700	138	33x5	Own.	6-4x5	38.40	Pierce-Arrow.....	Own.	DeCo.	DeCo.	DeCo.	m-d Own.	Own.	m Spicer.	1½F Own.....	3.93
2050	2000	2050	.....	2950	3000	126	32x4½	H-S.	6-3½x5	25.35	Pilot.....	6-50	Till.	Bijur.	Conn.	s-p B&B.	Muncie.	Hartford.	2½F Col.....	4.33
3150	3100c	3250	.....	4300	5100	128	32x4½	Own.	6-3½x5½	27.31	Premier.....	6-D	Johnson.	DeCo.	DeCo.	s-p B&B.	Spicer.	Arvac.	2½F	4.58
1035	1035	1750	1750	1825	117	32x4	Falls.	6-3½x4½	23.41	Premocar.....	6-40-A	Zenith.	Wagner.	Wagner.	s-p B&B.	Spicer.	Col.	2½F	4.66	
1665	1665	2385	2475	116	32x4	Own.	4-3½x5	22.50	R & V Knight.....	R	Strom.	Wagner.	Wagner.	s-p B&B.	B-L.	Salis.	4.75			
2475	2475c	2475	.....	3015	3105	127	32x4½	Own.	6-3½x4½	29.40	R & V Knight.....	J	Strom.	Wagner.	Wagner.	s-p B&B.	B-L.	Spicer.	1½F Tim.....	4.60
1505	1645	1485	1745	(2355c)	(2435f)	120	33x4	Own.	6-3½x5	24.34	Reo.....	T6 & U6	Rayfield.	N.E.	m-d Own.	m-f Own.	Own.	2½F Own.....	4.70	
3200	3200	3200	.....	4000	131	32x4½	Dues.	4-4½x6	28.90	Revere.....	C	Strom.	Bosch.	Bosch.	m-d B-L.	B-L.	m Spicer.	2½F Std.....	4.00	
1485	1485	1885	1885	1985	117	32x4	Own.	6-3½x4½	23.41	Rickenbacker.....	A	Strom.	Simms.	A-K.	c Own.	Own.	m Universal.	2½F Own.....	4.33	
2685	2685	2685	.....	3585	3585	128	32x4½	Cont.	6-3½x5½	29.40	Roamer.....	6-54-E	Strom.	Bijur.	Bijur.	s-p G-L.	G-L.	f Snead.	1½F Tim.....	4.88
3785	3785	3650c	3650c	4650c	128	32x4½	Dues.	4-4½x6	28.90	Roamer.....	47-75-E	Strom.	Splitdorf.	Strom.	m-d B-L.	B-L.	f Snead.	1½F Tim.....	3.77	
10900	10900	10950	.....	(13150)	143½	35x5	Own.	6-4½x4½	48.60	Rolls-Royce.....	Own.	Bijur.	Bijur.	c Own.	Own.	Own.	F Own.....	3.25		
1195	1195	1795	1795	112	32x4	Own.	4-3½x5	19.60	Saxon.....	125	Zenith.	Wagner.	Wagner.	s-p Detlaff.	Covert.	m Peters.	2½F	4.75		
1645	1645	2645	2645	118	33x4	Cont.	6-3½x5	25.35	Sayers Six.....	DP	Zenith.	DeCo.	DeCo.	s-p B&B.	G-I.	Arvac.	2½F Std.....	4.75		
875	875	.....	108	30x3½	Ly.	122	31x4	Own.	4-3½x5	19.60	Seneca.....	L-2 & O-2	Zenith.	A-L.	DeCo.	s-p B&B.	G-I.	Universal.	4.75	
1095	1095	1750	1750	112	31x4	Ly.	4-3½x5	19.60	Seneca.....	50 & 51	Zenith.	A-L.	DeCo.	s-p B&B.	G-I.	Detroit.	4.50			
990	990	1685	1685	114	32x4	Supr.	4-3½x5	18.23	Sperling.....	A	Zenith.	Bijur.	Bijur.	s-p B&B.	Warner.	Hartford.	2½F Peru.	4.45		
2150	2150	2395	2395	2750	3200	127	34x4½	Own.	8-3½x5	33.80	Standard.....	98	Zenith.	West.	Splitdorf.	s-p B&B.	G-L.	Arvac.	1½F Tim.....	4.45
2750	2750	2750	2425g	3950c	3985f	130	32x4½	Own.	6-3½x5	22.50	Stanley.....	740	None.	None.	None.	m Own.	None.	None.	1½F Own.....	1.50
1765	1765	2750	2750	118	33x4	Cont.	6-3½x4½	25.35	Starwood Six.....	Star.	Zenith.	West.	West.	s-p B&B.	G-L.	Peters.	2½F Std.....	4.50		
319	319	285	285	580	615	102	30x3½	Cont.	4-3½x4½	15.63	Stearns-Knight.....	SKL4	Rayfield.	Till.	A-L.	s-p B&B.	Climax.	West.	2½F Own.....	4.50
2250	2250	250	250	3150	3450	125	34x4½	Own.	4-3½x5	22.50	Stearns-Knight.....	SKL4	West.	A-K.	DeCo.	m-d Own.	Own.	Climax.	2½F Own.....	4.50
2700	2700	2850	2850	3500	3700	130	34x4½	Own.	6-3½x5	27.31	Stephens.....	90	Till.	A-L.	DeCo.	m-p B&B.	Mech.	West.	2½F Tim.....	4.90
1575	1575	1625c	1625	2450	2550	123	32x4½	Own.	6-3½x5	25.3										